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FROM THE EDITOR'S WINDOW

"WE CAN CUT your finishing time one-third if you use our materials!" This, in substance, is what the representative of a finish manufacturer declared recently when he gained an audience with the manager of a factory using industrial finishes.

"Do you know what our time is now?"

"No, but—"

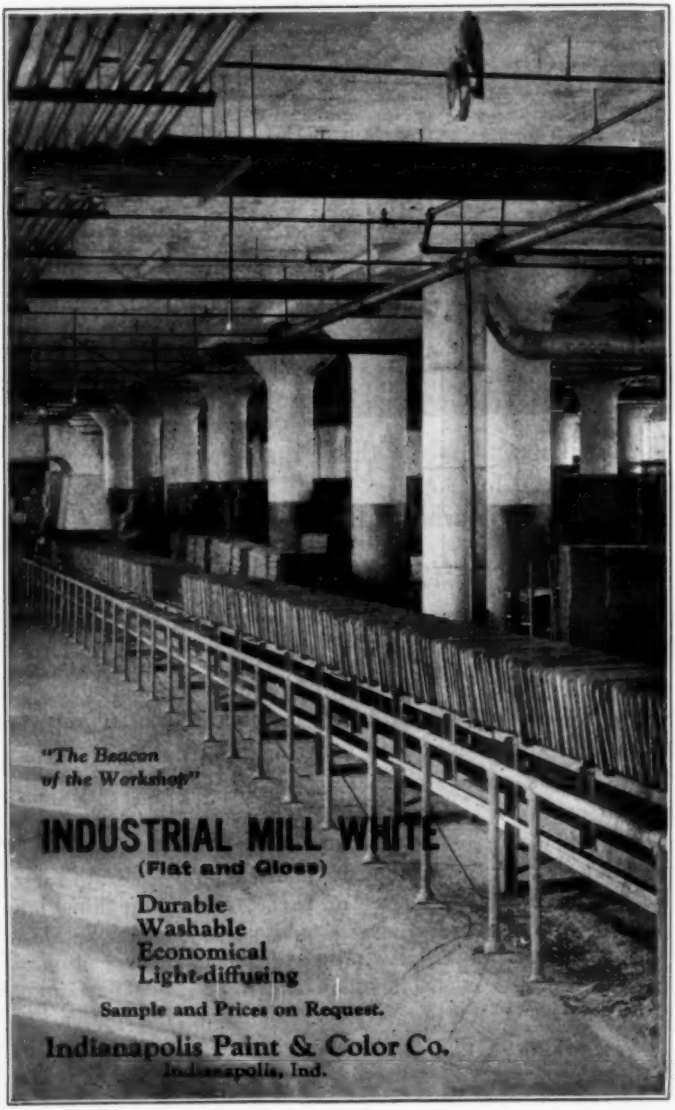
"Well then, you don't know what you are talking about," said the manager, and he promptly dismissed the representative.

This incident is typical of many which illustrate the need of sending out carefully trained sales representatives—men schooled to avoid making hasty statements or claims that are not backed with accurate information.

True, this is an age of speed, but speed is futile when such essential elements as diplomacy, courtesy and accurate facts are sacrificed. As a matter of fact, some of the finishing material manufacturers have dispensed with salaried salesmen to call on the industrial trade, the officials of the company preferring to go out on the road and handle this particular work themselves—all of which emphasizes the increasing importance of the merchandising end of modern business.

W. H. Rohr

Managing Editor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Lacquer Spraying Hazards and Safeguards

Superintendent of finishing points out where the real dangers and hazards connected with lacquer-spray finishing are, and tells what precautions to take to safeguard the workmen and the factory

By F. W. Purdon

SINCE the adoption of spray finishing equipment and methods, there has been no other step of advancement so important and revolutionary in wood finishing as the development and use of heavy-body wood lacquers. In a period of less than 25 years these two great discoveries have revolutionized the methods of wood finishing.

While much credit should be given to both of these two great productive discoveries, each one of itself has linked to it a hazard that must also be considered. The first hazard is the positive breaking down of health which comes from the spraying of certain classes of material under improper conditions. The second is the increased fire hazard, due to the highly inflammable and explosive nature of lacquer, and thinner vapors and lacquer dust.

The Real Danger

Now, to consider the first hazard as stated above: In several of the states, efforts have been made to create on the well-filled statute books, laws to prohibit the application of finishing coats by the spray method. Those who are fostering such legislation do so either from ignorance or they have an "axe to grind." Legislation is not the remedy.

To use a very good comparative illustration, let us consider electricity. It has been said by good authority, truthfully too, that a "little knowledge of electricity is a dangerous thing." The same may be truthfully said of the spray method and lacquer. No sane person would think of passing a law prohibiting the use of electricity because it is dangerous, inasmuch as it will burn, create fires, and cause very sudden death if used or handled without the application of precautious methods. Electric charged wires are dangerous. This most people know. Why? Through education.

Spraying lacquers that contain benzole, wood alcohol and many other materials are dangerous—under certain conditions—to the physical system, as is also electricity, only the destroying process may be a little slower. Electricity will destroy the tissues of flesh by burning and if the voltage is sufficient it will kill. Benzole will also destroy flesh tissues, attack blood cells and break down the bone marrow, and if the system absorbs enough of it, it will also kill.

No sane person would condemn the use of electricity because he knows if it is handled or used improperly many dangers exist; neither should the spraying method be condemned, even

though we know it is dangerous when certain types of materials are sprayed.

No manufacturer would think of wiring his factory without proper safeguards; no employe would think of handling carelessly a charged electric wire. Why? Education to the danger. Yet, we find there are many manufacturers who are subjecting their factories and employes to the dangers of spraying lacquer without proper ventilation. Why do we find this condition? Lack of education as to the great danger of fire and explosion from lacquer dust and fumes, also lack of knowledge in regard to the harmful effects of certain solvents and diluents some finishing materials contain.

We know there is a right and wrong way of handling electricity, and this also applies to the spraying of lacquers. It is extremely necessary where lacquer is being sprayed to have "proper ventilation." This does not pertain alone to the spray booth in which lacquer coats are applied, but also to the entire room where the work stands to dry after the coats have been applied, as there are fumes arising from fresh lacquered work for many hours, and it is from these vapors that the physical system of the employe is attacked, through absorption. Also, these fumes create the explosive condition which has been the chief cause of many disastrous fires.

Benzole Is Injurious

There are manufactured today many cheap lacquers that contain benzole, also methyl alcohol (wood alcohol), which are very toxic and injurious to the physical system. If you should entertain a suspicion of this being an established fact, I wish to refer you to the series of experiments carried out by Mr. Henry A. Gardner, Circular No. 250, Scientific Section, Educational Bureau National Varnish Makers Association, entitled "Physiological Effects of Vapors from a Few Solvents Used in Paint, Varnish and Lacquer." The experiments, scientifically performed, were conducted by Mr. Gardner on live rabbits. All of the rabbits were very carefully selected for each study. Some of the solvents used in this experiment were turpentine, petroleum distillate (mineral spirits), dipentine, butyl alcohol, solvent naphtha, benzole, furfural.

The method employed was to subject the animals to the fumes of one of the solvents until the animal died or until it was definitely proved that the fumes had no injurious effects to the animal. A very close examination being made daily of the animal's physical condition for any injurious symptoms which may have developed. A careful record was kept of blood count, weight, gain or loss.

Get this right! All of the animals subjected to the fumes of benzole died in about 40 days. The autopsy revealed definite pathological changes in the vital organs and bone marrow. I am sure if you could read the entire account of these experiments by Mr. Gardner, you would give some consideration to proper ventilation in spray finishing rooms.

Safe Lacquer Spraying

The second thought to consider is the increased fire hazard which comes from lacquer spraying.

All of the serious fires, which may be credited directly to lacquer, were fires where terrific explosions of vapor and lacquer dust completely wrenched the building in general, including the sprinkler

system, which is the chief means of successfully combating a lacquer fire. From personal experience gained with a lacquer booth fire, which I described in April, 1928 issue, page 28, the sprinkler system is the only positive means of combat.

Owing to our fine ventilation system an explosive condition could not exist and the fire was confined to the spray booth only, nothing else in the room being affected. I hesitate to think what the results may have been, had this room not been properly ventilated. I am sure there would have been an explosion of vapor and dust with a terrific loss of property and possibly life.

Our Ventilating System

The following is a description of the ventilation which has proved to be very satisfactory in our lacquering room: This room is 175-ft. in length, 60-ft. wide and it is on the top (fifth) floor of one of the large buildings. First, it is impossible to have proper ventilation unless there is an equal amount of fresh air supplied to replace the air exhausted from the room.

The fresh air is supplied to this room by 19 inlet pipes. The pipes are 6-in. in diameter and run through a 12-in. board which sets in the lower sash of the window in the same manner as a window screen. The pipe extends 6-in. on the exterior and 6-in. on the interior, where it elbows toward the floor. The bottom of the pipe is 10-in. from the floor. The pipes are securely fastened in this position.

The outlet for fumes and vapors is controlled as follows: Running the length of the room, in the exact center, are 14 outlet registers of iron grill cut in flush with the floor, (these measure 20 by 18-in.) and each of the outlet registers has an 8-in. pipe which connects it with the main exhaust pipe which is 24-in. in diameter. The main exhaust pipe is supplied from the ceiling of the room below, running the length of the room, directly under the outlet registers. The 8-in. pipes from the outlet registers are connected to this main exhaust pipe. In the center of the exhaust pipe there is an outlet pipe leading off at right angles to the exhaust fan. The exhaust fan is a 45-in. blower type and its speed is 570-r.p.m.

Fumes from lacquer are heavy and they go down toward the floor where they are drawn into the outlet registers and through the main exhaust pipe to the great outdoors. The air that is exhausted is replaced by the inlet pipes, which creates freedom from any explosive condition and gives a healthful atmosphere in which to work.

The Heating Arrangement

The room is heated with a nine-pipe steam coil running along two sides and one end of the room. This coil is heated with live steam direct from boilers controlled with a reducing valve, allowing 10-lb. pressure to the coil. The degree of heat in the room is controlled by three "Syphon Regitherms." The temperature may be kept at any desired degree.

Booth Exhaust

Two spray booths are in the room and each booth has a front opening of 14-ft.; each booth has two 22-in. diameter exhaust pipes, and each pipe is exhausted with an 18-in. aluminum fan running directly on shaft from a special type of enclosed motor. There are no sharp angles or corners in these exhaust pipes. These

(Continued on page 81)

"I have had pearl essence manufacturers and several individuals come to me asking how I got the finish on the automobile chassis at the recent auto shows, and because there seems to be a great demand for the finish and people wanting to know how it was done, I thought you would be interested to let the general public know how through INDUSTRIAL FINISHING MAGAZINE."—

Joseph M. Verderosa

MOTHER-OF-PEARL FINISH

Revealing detailed information as to what this new and strikingly attractive finish is, and how it is produced in different base color applications to give decorative distinction to a variety of articles

By Joseph M. Verderosa

AT THE recent automobile shows several automobile chassis on exhibit appeared as though they were covered with a layer of "Mother-of-Pearl." Considerable interest was expressed in this novel finish, and many requests were made for information as to how it was obtained.

The finish on these chassis was devised by this writer, who also supervised the application of the finishing materials. The following outline of the methods used will enable any experienced finisher to duplicate this mother-of-pearl effect on any article.

Articles that haven't a smooth surface, will have to be made smooth by the application of one coat of primer and as many coats of surfacer as may be necessary. The surfacer should be sanded between coats and made as smooth as possible after the last coat. Two or three coats of white or light ivory lacquer enamel are then applied and sanded smooth.

Yellow, Blue and Red

Next, apply the lacquer enamel colors that give the iridescent effect of the mother-of-pearl. Let me especially emphasize the importance of using the proper colors for this operation. The colors are yellow, blue and red. The yellow must be true yellow that has no green or red cast. The blue must not have a green, yellow or gray cast. The red must not have an orange or brown cast. In other words the colors must be carefully selected. If these precautions are not closely followed, the iridescent effect will surely be lost.

The colors are thinned in the proportion of seven parts of thinner to three parts of color, and applied with an artist's spray gun. Ordinary spray guns can not be used because they do not atomize the colors finely enough.

Colors Are Zig-zagged

The colors are applied to give a mottled effect. Yellow is applied

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first in a zig-zag course, stopping at irregular intervals. Blue is then applied in the same manner, only crossing the yellow. Where the yellow and blue come together a green color will be seen. Finally red is applied in the same manner as the two previous colors, crossing both the yellow and blue. Where red crosses yellow, the result will be orange; where red crosses blue, it will show purple; where red crosses blue on top of yellow, a rich brown will be seen.

Remember, these colors must be applied very lightly to get the realistic mother-of-pearl effect. If the colors are put on heavily they will be too pronounced and the true effect will be spoiled. The object of applying the colors to the base coat is to imitate the play of rainbow colors which are characteristic of genuine mother-of-pearl. If this is kept in mind, the finisher will not fall into the error of putting on too heavy a coat of color.

Pearl Essence Over Colors

A mixture of a high grade of pearl essence is sprayed on over these colors. This is mixed as follows:

Add about 5 oz. of pearl paste to a gallon of a special pearl lacquer, which has the ingredients so selected that the pearl particles will swim about for some time before the lacquer sets. If this does not take place the pearly appearance will not show up; the surface will look as if it had been sprayed with a silver powder.

Another very important matter is that the pearl mixture must be sprayed on wet, with a low pressure. Forty to 50 lbs. of air pressure is just about right. If a high pressure is used, for example 70 to 75 lbs., the pearl particles will be forced onto the surface with such force that they will remain lying in all angles, this producing a coarse appearance.

If it is necessary to thin the mixture before spraying, use only the solvents selected especially for use with pearl essence.

An Expensive Finish

This finish is somewhat expensive, of course. The pearl essence costs from $15.00 to $20.00 a pound, but it is so attractive that it is well worth it. It may be applied on a considerable variety of articles such as mirror frames, lamp stands and electric light fixtures; flower vases, gift boxes, small clocks, radio sets and a hundred other things.

The base color does not necessarily need to be white or light ivory in every case. For variety in this novel finish, different colors may be used as a base. For instance, in the case of the mirror frame, a light blue or even black may be used. Of course, the same three mottling colors are always used over every base.

Zeller's New Sales Manager

"We are writing to advise that Mr. Horace E. Hall has been appointed the Sales Manager for this company."—Zeller Lacquer Mfg. Co., Inc., 20 E. 49th St., New York City.

Changes in Valentine & Co.

At the annual meeting of the stockholders of Valentine & Co., 386 Fourth Ave., New York City, the following officers were elected:

Mr. N. T. Pulsifer, Chairman of the Executive Committee and Mr. A. L. Phillips, Chairman of the Board. Mr. Lawson Valentine Pulsifer continues as President.

Other officers of the company include: Mr. O. A. Hasse, Executive Vice President; Mr. Langdon B. Valentine, Vice President; Mr. Lawrence Phillips, Vice President and Treasurer; and Mr. L. A. Osborne, Secretary.

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Color in Modern Art Decorative Design

Color Specialist for the Kepec Co. explains more about color in reference particularly to the wise selection of proper tones, harmonies and contrasts for suitable decorative treatment along modernistic lines

By La Vera Ann Pohl

THE recent vogue for color is an expression of modern art, indeed it is one of the important basic features of modernism.

Fig. 1—This sketch illustrates broken planes of light and form, causing reflections which create a pattern or design.

The sweeping lines, contrasts and harmonies in colors—contrasts in light and shadows. These effects which are created by broken planes of light or form, reflecting themselves upon other interesting broken planes, create a harmony in line and a rhythm which has never been equalled in the history of design, extensive as it is.

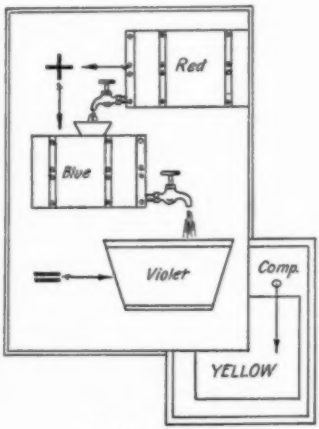
The modern colorist allows a brick to remain a brick, a walnut chair to remain walnut, a silver tray to remain silver, and an aluminum band to remain aluminum.

Nothing is antiqued into something of 500 years ago. Ivory does not become "Olde Ivory." Indeed ivory has been found charming in its newness.

An art which is creative must be *real*, must be alive. Modern art is wholly creative, therefore it is alive; it bespeaks new things, new things in color.

Theories of color are as numerous as the stars in the firmament. Each newly developed theory tries to point a new path. There are changes in theories, changes in color styles just as there are changes in design, but fundamentally the rules remain the same.

In this day of scientific knowledge and accuracy, people still believe the old law, that red, blue and yellow as primaries, and green, orange and violet as secondaries holds true for all purposes. This, however, is not the case with those individuals who deal solely with the spectrum; for them red rays and green rays combined can result in brilliant yellow, or green rays, and violet rays can produce a brilliant blue. It is therefore necessary to state that we will not deal with color from the spectrum point of view or from the point of the illuminating engineer, but solely from the point of the painter, that is, from the pigment angle.



Results with colors.

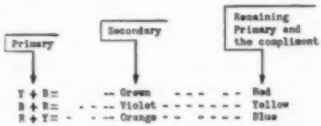


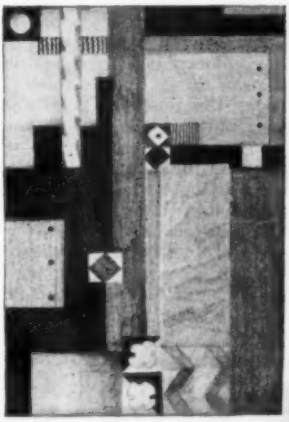
Fig. 2—Results of color mixes.

From the standpoint of pigments, *red, yellow and blue are primaries, while green, violet and orange are secondaries.* Two primaries are mixed to produce a secondary color and always the remaining primary color is its complement, as indicated in Fig. 2.

If we mix the secondary and its complement we will find these results:

Green plus red equals gray.
Violet plus yellow equals gray.
Orange plus blue equals gray.

If the three primaries were mixed, gray would be the result and the more nearly in equal proportion the mixtures are, the more neutral the gray becomes, until finally it should appear black (red plus blue plus yellow equals gray —approaching black), whereas on the other hand, if the three secondaries were mixed, gray would be the result and the more nearly in equal proportion the mixtures are, the more neutral the gray would become until finally it should appear white. (Green plus



Modernistic in Design.

orange plus violet equals gray—approaching white).

In the terms of the colorist, *Value* means the amount of dark and light in a color. For example, referring to Fig. 3, this block decreases in value as it passes from *A* to *B* and increases in value as it passes from *B* to *A*.

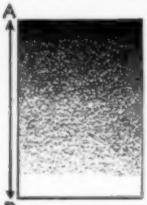


Fig. 3—Illustrating the effect of value—the amount of dark and light in a color.

Tone means a tint of color as, red plus orange equals red orange; but adding one part white produces a medium red orange tone.

The term *Shade* is never used to indicate a tone, for shade always means shadow.

From the modernist point of view, color plays an important role from the standpoint of health, wealth and happiness.

Green and blue are cool colors—restful to the eye and mind—and lend a spirit of bigness to an article or room.

Red, yellow and orange are warm colors; they are restless and make things appear small.

Today the tendency is to keep away from the warm colors such as red and browns, and use the cool colors for cool effects and to lend an atmosphere of bigness and space to everything.

The modernist sets up his "marry well" palette as shown in Fig. 4. White enjoys no range of color partners, for the reason that a color placed beside white absorbs and reflects part of the color and therefore changes the appearance of the color (white).

Black and *Green* enjoy more combinations than any other colors listed. A table of agreeable

Red	Orange	Yellow	Green	Blue	Purple	Gray	Black
White Yellow Brown Orange	White Red Brown Yellow	White Brown	White Yellow Red Blue Brown Black	White Black	White Red Blue Black	All colors including White	All colors but not White

Fig. 4—Colors as set up by the modernist.

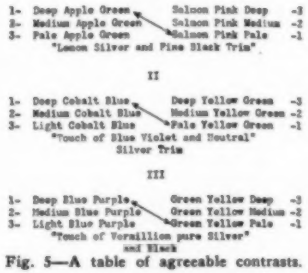


Fig. 5—A table of agreeable contrasts.

contrasts in the new mode is exhibited in Fig. 5. In the table of contrasts you will note that No. 1 enjoys contrast No. 1 as a partner, that is, "Deep Apple Green" versus "Salmon Pink Pale." They are listed side by side—deep, medium and pale—because in the blending from deep to pale the same amount of white should be

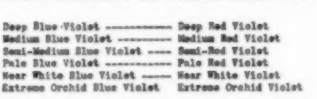


Fig. 6—Color tones which reveal the tendencies in modernism.

used in each, that is if a quart of white is used in the (deep) Apple Green to obtain a specific (medium) Apple Green, that same amount of white should be used in the Salmon Pink (deep) to obtain a (medium) Pink Salmon. The relationship to the contrast partner should be that they are both of the same value before mixing.

The colors named in Fig. 6, held together or contrasted by blue green in several tones, or

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yellow green in several tones, are the tendencies in modernism, and all colors thus employed in absolute harmony and perfect relationship can never become boisterous or garish. In other words, colors used in scale formations such as illustrated have a definite established characteristic which is refinement.

Red and green in certain tones can oftentimes become vulgar in effect. However, when broken by a third member—a pink green or a green red, i. e., mixing a red and green for a third relationship which becomes a paler grayer tone—the whole thing is set right. There is a definite brotherhood of feeling in the complementary colors.

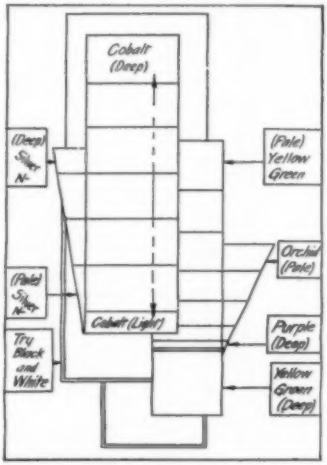
With the employment of silver in the decorations of today, it is perhaps wise to point out that there are several varying types of silver on the market.

1—White silver (silver plus white)
2—Steel silver (silver plus blue)
3—Aluminum silver (aluminum powder)
4—Neutral silver (½ gold, ½ aluminum)
5—Lemon silver (gold, aluminum, touch of yellow)
6—Rose silver (gold, silver, touch of Alizarin)

With each table of contrasts or harmonies listed above, a definite silver blend is involved and it is a good thing to experiment with silver mixtures a bit in relation to color to find for oneself the endless varieties of effects one can arrive at.

There are many types of red such as carmine, Indian, Tuscan, Alizarin and vermilion, all influenced in one way or another by yellow, brown or blue. Just as there are a number of commercial blues, greens, yellows, etc., all influenced by other colors. However, when the colorist speaks of mixing and blending tones, it is taken for granted that none but *pure* and perfectly neutral colors such as a pure red—which is not influenced by yellow or blue—are employed.

In the scales of harmonies and agreeable contrasts, the regular commercial colors can always be



Harmony Chart. It is suggested to try the harmony chart in proportions as shown. In each case start with deep color, blending with white gradually to pale.

employed. Nothing is more important for the finisher or for the decorator of today than a keen sense and appreciation of color. In many instances this consideration is set aside and good work and beautiful articles are ruined by the neglectful arrangements of tints.

Nature is the best source of information about color. You will note in nature no color becomes isolated and too brilliant; each color bears a relation to another. *Colors* share a common ground. Color is a form of expression. It enhances a construction; it is a

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higher type of decoration; it must never be abused.

There is a keen pleasure in the learning of color and the development of an appreciation, which not only adds joy to the daily work, but which enhances the beauty of the world about the individual tenfold. Every change in the position of the sun, every shadow or reflection in a pool every quivering leaf or blossom takes on a delightful hue which can be intimately enjoyed if the mind has been trained to observe it.

The modernists have learned the value of color, the importance color plays in every walk of life. They have developed a high order of tones, a refinement in harmonies which has never been so widely employed before. They have so intimately related color and design with ease, comfort and beauty, that all have become basic necessities where modernism is involved.

Sponging Doesn't Loosen Veneers

At one time we were having trouble with blisters showing up on our veneers. The shop superintendent thought it was being caused from sponging too heavily with water. The veneer had evidently loosened from the corestock, and it always seemed to happen immediately after the sponging.

Upon investigating the trouble more thoroughly I decided that sponging could not be the cause if the veneer had been glued to the corestock in the first place.

A piece of veneered panel, evidently sound, was sponged at frequent intervals until the veneer pulled loose. Several spongings were necessary to accomplish this. Surely one light wetting, such as is given in regular routine work, could not do it.

Then I took another piece of veneered panel and sponged it very heavily with a water stain. After becoming thoroughly dry, the panel was sanded until there was no color left. The depth that the color had penetrated proved, I believe, that no damage could possibly result from this source.—E. B. S.

New Finish For Oak

"Castle Oak Oil Stain" is the name of a new stain for Oak which has just been announced by the Lindeman Wood-Finish Co., of Indianapolis, Ind.

This stain, according to the manufacturer, should be of great interest to many furniture manufacturers because it produces a beautiful finish on an American cabinet wood which is well known for its durability and permanence.

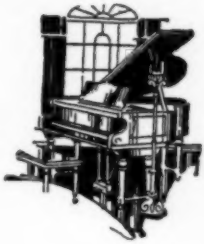
New Book About Modern Color Schemes

The modern trend in style and color in house painting and interior decoration is described in the new book "Modern Color Schemes for Your Home," published by the Paint and Varnish Division of E. I. du Pont de Nemours & Co., Wilmington, Del.

The book illustrates the more colorful ideas which are being applied to exterior house painting and also several new and unusual color schemes for interior rooms. It was prepared by the Du Pont Home Decoration Service, collaborating with the Du Pont New York-Paris Style Service and with leading architects and interior decorators to set up new, modern, color schemes for different types of homes and for interiors.

Color schemes for each well-known type of home architecture are suggested, including Colonial, early Colonial, Dutch Colonial, early American, Italian, English, cottage and bungalow types of houses. Several color schemes for each type of house are suggested.

The book is being offered in du Pont paint and Duco advertising this Spring upon receipt of 10 cents to cover the cost of mailing.



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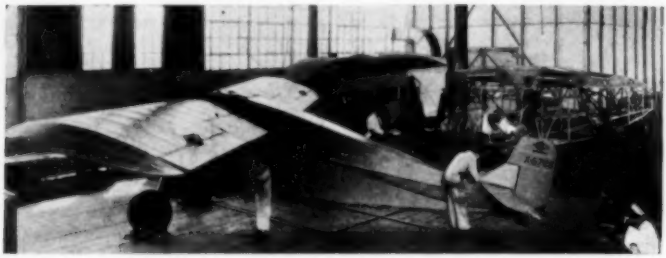

AIRPLANE LACQUER DOPES HOW TO APPLY THEM

Superintendent of Covering and Finishing Dept. at General Airplanes Corporation explains in detail the sequence of operations involved in applying the lacquer dope coats to all fabric surfaces, and tells how to avoid certain troubles that are frequently encountered

By George A. Endom

DOPE is a cellulose cotton product having many of the characteristics of pyroxylin lacquer. It is usually heavier in body and is furnished by the manufacturer in both clear and pigmented form. Its function is to fill the weave of the fabric, make it waterproof and airproof and to tauten the fabric on the frame. Also it acts as an adhesive to fasten the reinforcing patches and tapes where needed and, when a high-grade dope is properly applied, it toughens the fabric to an extent where it will withstand the full driving power of a man's fist without bursting or even cracking.

Until recently nearly all covers were doped first with cellulose acetate clear dope and finished with cellulose nitrate, either clear or pigmented. Now there is very little acetate dope used as the cost prohibits its use on commercial airplanes. The majority of airplanes are now finished in nitrate dope, but because I have always found the former finish in good condition after much exposure to extreme temperatures and sustained flight, I am going to give this method of finishing, even though many may consider it obsolete.

Acetate vs. Nitrate Dope

First, in order to justify myself, I wish to give the reader an in-

Author's Note: Because the details of fabric work and covering are unsuited to this publication, I am obliged to dispense with this important part of aircraft finishing and proceed next with the details of doping the airplane surfaces after all the fabric work is completed.

If any readers desire to inform themselves on the subject of making covers and applying them to airplane frames, I shall be pleased to let them know where this information can be obtained.

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sight into the finish of a few famous airplanes on which this method of doping was used.

Byrd's North Pole job, the "Josephine Ford;" Maitland-Hengenberger's ship, the "Bird of Paradise;" the "America," which Byrd flew to France; the "Question Mark" and countless others were finished with a clear acetate dope base and pigmented nitrate dope top coats. It was the only finish allowed by the United States Army!

This finish was applied when airplanes were seldom put in hangars. Many stood out on fields all winter with only motors and cockpits covered; in the spring they were given a cursory inspection; a few repairs were made to the metal or wood; a patch was applied where the cover has been damaged, and then the 'planes were flown most of the summer. But this finish needed careful workmanship in its application; if not properly applied, it would not last very long.

An all nitrate dope finish has its good features from the finisher's point of view. It costs less per gallon, it is easier to apply and it presents a much better appearance, especially if a high-grade flexible lacquer enamel or clear lacquer is used as a gloss. A great number of record-breaking airplanes were finished in all nitrate, and now 70 percent or more ships are finished in this way.

But this finish hasn't the flexibility nor durability of an acetate base finish. It requires more coats to build the same film and in most cases weighs more than the former finish.

A New Finish Needed

Studying airplane doping from many angles, one may gather from the foregoing that there is need of a product that will displace both acetate and nitrate dope. I may be premature, even mistaken, but knowing a little of the various experiments that are being conducted by many paint, dope and lacquer manufacturers, I am of the opinion that eventually some company is going to develop either a chemical or synthetic product that will act on untreated fabric as cellulose cotton now does—eliminating much of the trouble now experienced with dope. This is only a thought now. I may have more to write on this subject later.

Applying Acetate Dope

The U. S. Army specification for doping airplane surfaces called for four coats of clear acetate dope, brushed on by hand, and two coats of pigmented nitrate dope, applied by spray.

The first thing the finisher must watch is the temperature and humidity of the room in which the work is done. It is not advisable to apply any dope in a room which has a lower temperature than 70-deg. F. Also, at this temperature, if the relative humidity is greater than 65 or 70 percent, blushing will result. And blushing or whitening in dope is much more serious than in lacquer. I have found that serious trouble will result if blushing is not eliminated. Besides discoloring, the film tends to become brittle more quickly; tapes and patches will not stick properly, and the cover may finish too slack. Because of this I will note blush results with each coat. Also some ways of eliminating same.

Before applying the first coat of acetate dope, be sure that the fabric cover is thoroughly dry. On wings or other large surfaces, the dopers usually work in pairs, one at each side of the panel. Four inch brushes are used as a rule and the men should be careful to

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"cover the laps," that is where the two brushes meet on the section being coated, care should be taken that neither "pools" nor bare spots are left. Pails should contain enough fluid to coat the entire half of the side to be doped. If the amount of dope required to do this is too much to handle conveniently, refill pails should be placed where same can be picked up without any loss of time, as the material dries so fast that a continuous motion should be maintained or a lap will show that cannot be obliterated.

The first coat is brushed into the weave until fabric is damply saturated. Dope should not be allowed to form "pools" on this coat. If it does, it will run through the fabric and cause "freckles" or inside drops that become more prominent with each succeeding coat, and which present a very displeasing appearance. Too much brushing will also cause these drop marks, and once they have formed, the only way they can be removed is to scrape them from the inside—and this cannot be done on the average covered frame.

A careful even coat must be applied. If too much dope is put on any particular place, it will show shadows or appear smoother than the surrounding surface, or run through as before mentioned. If too little is applied, or if it is brushed too long, the coating will be too thin and it may run through on the second coat or it may cause trouble when applying patches or tape at that point, since the first coat acts as a size as well as a filler.

Blushing; Drying

Blushing of this coat may prevent proper adherence of the film to the fabric, which will later cause checking or cracking. So care must be taken that no direct draft strikes the coated surface before it is dry. Also, remember it is not advisable to add thinners of any kind when applying this coat. Last, be sure that the dope was in an air-tight container before being drawn for coating purposes. Blushing is seldom experienced in this coat when the foregoing instructions are followed.

When dry, which is usually soon after that side is finished, the wing or other surface is turned over and the opposite side coated. On large fuselages, which cannot be turned, it is best to coat the bottom first as the heavy fumes will settle to the floor and cause discomfort to the doper. The top should be coated next and the sides last. This is merely a suggestion based on experience.

After the first coat is finished, it should be allowed to dry at least two hours. It will act in this manner: At first it will tighten and have a ringing sound when touched. As it dries, the first coat of acetate will slacken the cover slightly more than before coating, and finally attain a little more than its original tension. In appearance, the coated surface should present an even color, slightly darker than the fabric originally appeared. This first coat of dope should raise the "nap" enough to make the fabric feel as rough as No. 1 sandpaper. When all these signs appear, you can be reasonably sure the first coat of acetate dope has been so applied that the cover is ready for the next operation.

Applying Patches

Cloth patches cut to the size required are next put on using the same acetate dope as a glue. These patches are put on wherever an external fitting is to be placed. Also, wherever control

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cables come through the cover and wherever a corner bolt or internal brace bears against the fabric from the inside. These act as a reinforcement for the cover, making it of double thickness at these points.

Wherever any cable or other part rubs against the cover, leather is usually sewed to the patch, giving added strength. A good way to apply these patches is to use a board. The patch is laid face down, wet thoroughly with dope and immediately applied to its position. It is rubbed smooth, care being taken that all air bubbles are rubbed out and that edges are well stuck. Also that no excess dope is left around or under patch which might cause a bubble or strain.

The patches can be applied with a wet brush, first brushing that spot where the patch is to go, placing patch and then smoothing with brush again. But this is not as satisfactory as the former method, as the surface surrounding the patch gets an extra coat which shows on the final finish. For this reason it is not advisable to apply the finishing tape this way.

On wings and tail surfaces, which can be worked flat, the finishing tape which goes over every rib, is best applied with the second coat in this manner: Cut tapes to length required, lay alongside of place where they are to go and proceed with second coat of dope.

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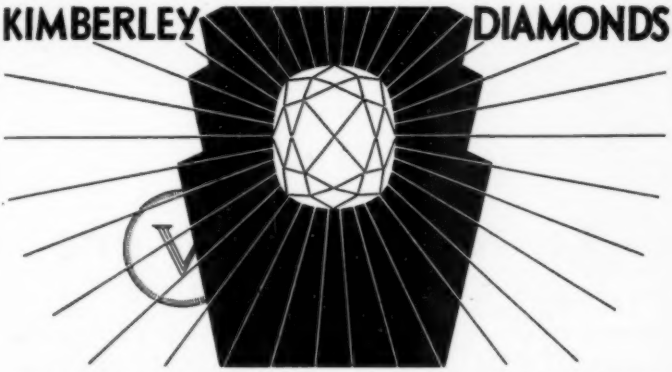
The Sewall Paint and Varnish Co., (paint and varnish mfr.), Kansas City, Mo. and Dallas, Tex., has published a 16-page booklet (10x6½-in. page size) in colors that describes "Dural" aircraft finishes and gives specifications for applying the complete line of finishing materials for all parts of the modern airplane.

Berry Bros. New Building Nears Completion

It is announced by Berry Bros., Inc. (varnish, enamel, lacquer, stain, shellac), Detroit, Mich, that the company's new four-story building, which is to house the Berryloid Division (aviation finishes), is nearing completion. This new addition to the Berry Bros. plant will be devoted exclusively to the manufacture of Berryloid.

KIMBERLEY DIAMONDS



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Glass is used in ten-cent diamond rings. It sparkles and looks "just as good" as a genuine stone. But no one takes a ten-cent diamond seriously.

Shellac is also widely imitated. The market is full of "lac" compounds, substitutes and adulterated products whose main claim is that they are "just as good" as Pure Shellac —alas, like ten-cent diamonds!

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"Enclosed you will find the article I mentioned about water staining. I am leaving the title suggestion to you, as I do not know under what heading it should come.

"Hoping that, if published, it will be of some value to readers of INDUSTRIAL FINISHING, *I remain"—*

E. T. Miller.

FINISHING HARDWOOD STORE FIXTURES

Foreman Finisher in store-equipment factory explains how he prepares and finishes custom jobs in birch, within a three-day schedule, using three coats of lacquer

By E. T. Miller

SINCE the introduction of lacquer into the finishing room, finishers are often bothered with "bleeding of color" when they use oil, alcohol, or acid stains. This bleeding of stain into the lacquer has a tendency to change the color of the finish. Sometimes a heavy coat of shellac applied over the stain—before the lacquer coats are put on—will stop this bleeding, but this cannot always be relied on as being a sure remedy.

One of the remedies for this bleeding is to use water stains, but in nearly every issue of this magazine I find an article objecting to the use of water stain because "it raises the grain of the wood." Of course, we must admit water stain will raise the grain. In all the articles that I have read, the writers say, "sponge with water and sand before staining." This requires a lot of work and I do not believe it is necessary, except when you are using water stains on oak.

The object of this article is to explain the process I have been using in finishing birch and mahogany, without the customary sponging and sanding before staining. This article applies particularly to finishing birch, the only difference on mahogany being that a heavier filler is required.

No Two Jobs Alike

The products of our factory are store fixtures, and in the store fixture line we seldom have two orders alike. They vary as to design, size, and color. In practically every case we have to make up a sample and submit it for the customer's approval. In making up these samples I follow the same process which I am about to describe here.

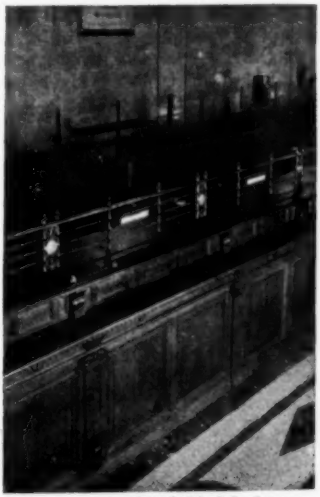
All these fixtures leave the cabinet department ready for the finish. In fixtures, we have panel work, counters, show cases and the unit line, which includes displays, drawers, wood and glass fronts and shelves; also many other articles that help to make complete store fixture installations.

When the work enters the finishing room, if any defects are

found, such as improper sanding, checks or any other marks, the articles are rejected and sent back to the woodworking department for repairs.

Spray Water Stain

We take this work first to the spray booth where is it given a coat of water stain—we will say walnut color, for instance. In



A bank counter job finished in lacquer.

applying this stain the operator sprays on a liberal coat, which is immediately wiped off with soft rags. This wiping leaves the surface uniform in color, taking out all streaks caused by any uneven spraying.

On all our staining operations, the spray operator has two helpers. These helpers move the work to and from the spray booth, as well as doing all the wiping of the stain. This speeds up the handling of the work and does not take the operator away from his gun.

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After this stain has been allowed to dry from two to four hours, we start with the first piece that was stained, and sand. This is the first sanding operation and the surface must be sanded smooth, regardless of sanding out the color—as this can be remedied in the later operations.

Brush Filler on Birch

Since birch is a porous wood, it requires filling, especially under lacquer. We use a prepared filler which we cut in the proportion of 8-lbs. of paste filler to one gallon of naphtha. We apply this filler with a suitable bristle brush and allow it to dry thoroughly before cleaning it, as it is not of a very heavy consistency when put on. After cleaning and wiping the surface with rags, we leave the job stand overnight to dry.

Next morning we start the second sanding operation. Again the surface must be sanded smooth, removing all particles of filler that may have remained sticking to the wood.

"Slush Stain"

After this sanding operation, we are ready for the second staining. By taking the first stain that we used and reducing it in the proportion of one part stain to one part water, we get a light stain which we call "slush stain." This stain is also sprayed on over the filled wood surface. Here we must be careful to avoid letting this coat of stain stand; it must be wiped immediately and dried by the helper.

This slush stain does not require long to dry (only about two hours) as the filler seems to retard penetration of the stain into the wood. At the same time it seems to blend into the stain under the filler and darkens all

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the light spots that may have been made by the first sanding.

Merits of This Method

By using this method of staining we find that, (1) we get depth of color, (2) we have a chance to remedy any defects that may show up after the first staining—and we are able to get them repaired, restained and filled with the regular run with which they were started—and (3) we save time.

By sponging, sanding, staining, sanding, and filling, the finisher cannot get enough work through the filling operation in one day for a full day's run the next day. However, with my staining, sanding, and filling method, I can get more than enough ready for the next day's run.

Primer Under Lacquer

When that second stain or slush coat is dry, we are ready for the primer. It is not necessary to sand this last stain. There are a number of good primers that sand good and work well under lacquer. If one prefers shellac, he can use "4-lb. cut" and reduce it in the proportion of one part of shellac to one part of alcohol; this will spray easily and give a satisfactory surface.

After sufficient time has been allowed for drying, the surface is ready for the sanding operation—and since this is the final sanding before the lacquer finish, the surface must be sanded real smooth.

Sanded-Through Corners

During this sanding operation, the sanders will probably cut through the sharp edges and corners. To take care of this, the finisher takes a small container of the original stain and,

using a small soft stick dipped into this stain, he touches up all the "sanded through" edges and light spots. He wipes off the surplus stain with his finger promptly, as otherwise it will show a dark line if allowed to dry.

Three Coats of Lacquer

Now we are ready for the final or lacquer finish. By proper handling of the job we can get three coats of lacquer on this run of work before the day is over. Next morning, which is on the third day from the time the order was started, we are ready for the rubbing and polishing.

Since most rubbing and polishing operations are pretty much the same, I will not go into details about it here, except to state that we are having success using No. 0 steel wool dipped into a mixture of pumice stone and rubbing oil, the polishing being done by felt pads dipped in rubbing oil.

We find this method is quite practical, as it gives a good depth of finish and saves time by eliminating at least one sanding operation, and it gives a three-day schedule to work from.

No person can sell quality who does not believe in it.

"Bob" Nelson Now With Lindeman

Mr. Robert Nelson, well known salesman throughout Virginia and N. Carolina and formerly with a New York stain and filler company has joined the Lindeman Wood-Finish Co. of Indianapolis and will represent Lindeman in Virginia, Tennessee and Georgia.

"Bob" is an expert finisher and is able to finish samples for furniture manufacturers and others, throughout his territory. He is working out of High Point in connection with "Bill" Burgess, who has represented this company from his office there for the past 7 years.

And What a Sweet Painting Job

Big painting jobs are much easier and far cheaper—small jobs are really a pleasure instead of a bother—if they're done with the new Presto Model "82" Electric Spray Gun.

For the Presto "82" with its larger volume of air and higher pressure (25 to 30 lbs.)—wider spray—perfect atomization—and efficient internal mixing chamber—licks high painting costs and eliminates tedious hand brushing on jobs both large and small.

Try the Presto "82" out on one of your finishing jobs. The low costs—the high speed—the smooth work—the ability of the gun to reach out-of-the-way places will amaze you. Send the coupon for complete information.

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PORTABLE RUBBING MACHINES

Foreman finisher explains interesting facts about rubbing machines, reveals his experience with some of them, and suggests an idea for the development of a new type of rubber

By M. V. Leach

FORMERLY, I was of the opinion that a rotary type of polishing machine would make whorls on a finished surface, because we were always instructed in hand rubbing and polishing to use short straight strokes: never a circular motion. But let's look at a polisher with a machine in actual use.

How to Use Rotary

If the whole face of an abrasive disc is placed flat on the surface with pressure, whorls are bound to be the result. But if polishing discs are prepared with a slight stiffness, and if only one edge is pressed against the surface instead of the whole of a complete flat side of the disc, there cannot be a whorl.

Centrifugal force makes a cloth buffing wheel somewhat stiffer when it is spinning on a polishing head. It is the same with a buffing wheel on a flexible shaft. When speeded up, a fairly soft flexible buffing wheel will offer enough resistance to exert all the friction needed to polish a surface without much pressure on the part of the operator.

Advantages; Disadvantages

Of course, I do not think this machine method is as perfect as hand work, but why worry about it if it is being done and looks all right? It requires a lot of hard work to rub out and polish an article from surfacer to finish, and if a machine can make a fairly good job of it and make it nice enough to be acceptable to the public, Glory be!

Or, if only the main parts or large surfaces are taken care of by machine, leaving mouldings, reveals, etc., to be done by hand, it is a great help and comparable to the large machines used for digging post holes for telephone poles—"No good when they strike rock, but sure get to the rock quicker!"

I believe there is room for improvement in most of the portable rotary rubbing and polishing machines, and improvements are being offered every day in attachments for various tasks to be performed. I have spent considerable time and a little money experimenting with various crude polishing appliances, both rotary and vibratory. I have hooked up pads on electric barber clippers, and have tried several other stunts, but the trouble has always been the *friction pad was so small it soon wore out and had to be replaced too often.*

New Idea Suggested

Therefore I offer as a suggestion for what it is worth, to anyone who wants to use it, the following idea: Begin with a flexible shaft having an internal flexible shaft

which will work back and forth longitudinally instead of rotating. At the free end of this reciprocating flexible shaft there is placed a handle or chuck for holding a pad over which is drawn and held firmly, a section of a roll of abrasive paper or abrasive cloth, the main roll of abrasive being kept or carried on rack on the stand and fed through by inches on up the shaft to the polishing block. A slight pull on the paper or cloth would pull out the worn part and pull in a new section. The worn piece could be torn off and thrown away; or this strip of abrasive material could be arranged to be fed automatically to the rubbing pad, at any desired speed.

The chief merit of this suggested type of machine is that it would deliver strokes similar to hand strokes, yet it would be very light to handle. The pad over which the strip of abrasive cloth is used could be moulded to conform to a variety of curves and contours, each workman taking care of a certain part of the surface for which his pad is moulded. This idea may be an idle dream, but it seems highly possible and practical to me.

Varnish and Enamel over Lacquer

To successfully apply varnish or varnish enamel coatings over lacquer, the job is handled about the same as when applying these materials over shellac. Of course, there is no knitting of the two materials by solvent action; paint or varnish holds onto a lacquered surface only by adhesion, therefore it is imperative that the lacquer surface be clean and free from oil or grease. To assure this condition, give the article a good rubbing with naphtha and

new!

Economy Deluxe Sprayer

For the user of industrial spray equipment this new *Economy DeLuxe Sprayer* gives better application of any paint, varnish or lacquer. Combines high efficiency, simple operation and puts new life in the paint shop. Light in weight, does not clog, easily cleaned. There are many good reasons for the present popularity of Economy Spray Products PRICED: *DeLuxe Spray Gun—with material tube, cover, container, 25 feet air hose and connections and agitator . . . $32.00. Above without agitator . . . $30.00. DeLuxe Gun without any of above accessories . . . $22.00. 25 feet air hose with connections . . $4.50. 1 quart metal container without cover . . . $2.50.*

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Please ship me equipment listed on margin. Send complete specifications and data on other Economy Spray Equipment.

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Address .....
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The Blue Knight's Column

MACHINES don't solve problems — not finishing problems! And when manufacturers bring problems to me to solve, looking for a new finish, a reduction in costs, or a kink worked out of their production methods, I feed the problem to a body of men I am proud of because they are hand-picked specialists in a *difficult* field.

All the officers and executives of this company, as well as our technical men, are Chemical Engineers or Chemists. In this plant, tough jobs are treated with the respect coming to them because *everybody* knows what is involved . . . .

If you would like to see a series of research bulletins I have published on some finishing problems *already solved* for manufacturers, which may help you, I'll be glad to send them on. Write to the Technical Service Department, please.

The Blue Knight

ROXALIN FLEXIBLE LACQUER COMPANY
101-9 SEVENTH AVENUE
LONG ISLAND CITY

4/0 or 6/0 sandpaper to clean up the surface and at the same time give tooth or anchorage, before applying any of these materials over lacquer.

I have had little trouble in this practice when the lacquered surface was free from oil and moisture. Such a finish adheres about as well as if applied to metal. A long-oil enamel or varnish should be used, for after long exposure, varnish, paint or enamel may be expected to craze, crack, and chip, and perhaps peel, for when lacquer is thus sealed up with this kind of film it still retains its elasticity, whereas the film of paint, varnish or enamel gradually loses elasticity, resulting in the unequal power of expansion of the two materials.

This expansion is governed by the amount of oil or life-giving element in the finishing material, since complete amalgamation of the enamel and lacquer by one material "melting" into the other through the action of solvents cannot take place. Lacquer should be allowed to harden thoroughly before any coating is applied over it.—M. V. Leach.

Production in the finishing department sometimes suffers because of the confusion from the different combinations given to the product. Standardized combinations, standardized materials and standardized methods of application under capable management can help wonderfully to make things move like "clock work."

New Folder of Mixers

The Alsop Engineering Co., (mixers, pumps, filters, etc.), 47 West 63rd St., New York, N. Y., has ready for distribution a six-page folder showing installations of its equipment in prominent plants. The complete line of portable electric mixers and the new glass-lined electric mixing tanks are also described and illustrated.

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require no departure from usual finishing methods.

Brilliant Colored Enamel can be used the same way as Black Enamel, same Thinner, same equipment for applying; they require only lower oven temperature, and same temperature and same time for each bake.

Hilo Colored Baking Enamels, because of their continuous good working qualities, help maintain a fast uninterrupted finishing schedule.

Stimulate the sales of your products with brilliant colors—preferably the most popular colors of the day—Jade Green, Oriental Red, Chinese, Yellow, Holland Blue (see page 2 this issue). Assure smooth going in your finishing department with Hilo Colored Baking Enamels.

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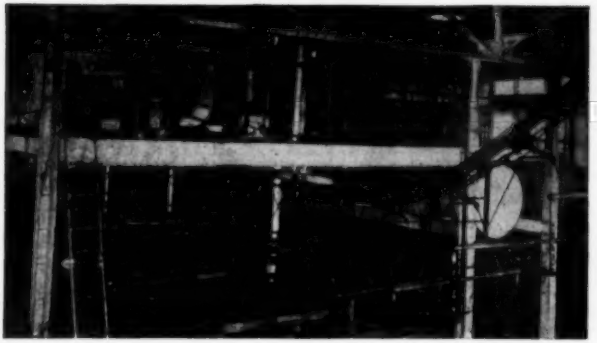

The Type "N" Heater and Oven shown above are popular equipment with the automobile manufacturer for the baking of japans on bumpers, and drying paint on auto frames.

These Heaters made for Oil or Gas Firing are a very efficient and economical source of heat for all processes requiring large volumes of high temperature air for drying and baking.

Other Uses of the Type "N" Heater

Burning Oil from Springs, Pre-heating for Dipping, and afterward Baking of water Japans. Burning old Japan and Oil off Fenders and Automobile parts before refinishing, and — for many Miscellaneous purposes in Automobile Plants.

The Nichols Products Corporation in conjunction with the Continental Industrial Engineers, Inc., are the sole licensees under patents No. 1,524,340 and 1,680,279 and any infringements thereof will be prosecuted.

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Modern Japanning Practice

Practical recommendations about suitable oven temperatures, ventilation and length of time for baking, to produce satisfactory results; also suggestions about temperature of metal to be finished and the japan being used

By T. E. Moorefield

AFTER the metal articles to be "bake-finished" have been dipped and allowed to drain until the japan is properly "set," they are transferred to the oven as quickly and carefully as possible. Care must be taken to avoid changing the relative position of the articles (usually suspended from hangers or mounted in racks) when they are being placed in the oven, or the flow will be changed, and sags and wrinkles may form.

For the first part of the bake the temperature should be run up slowly. If high heat is applied too quickly and the japan has not set long enough, the heat will resoften the japan and may start runs or sags from cracks, seams, machine holes, bolt heads or other uneven places on the surface.

The temperature must be uniform throughout the oven in order to produce a uniform finish on all articles placed in the oven. Actual tests have shown that in some cases there is a difference of 75 to 100-deg. F. in different parts of the same oven.

Oven Temperature; Time

If an excessive temperature is used the life is baked out of the japan and it becomes brittle; if insufficient heat is used, the finish will be "mushy" and can be easily marred. Mushy undercoats, due to insufficient baking, are likely to cause the finishing coats to sink in and die away in luster within a short time after they have been applied, although the surfaces may have appeared to be perfect when first finished.

Castings and other heavy metal parts require more heat to raise their temperature to a given point than thin sheet metal. For this reason it sometimes happens that the japan on heavy castings will be underbaked, while that on sheet metal, baked in the same oven, will be perfectly hard. Or, if the japan on the castings is baked hard, that on the sheet metal may be overbaked to such an extent that it is brittle. As nearly as possible, metal of the same general weight should be baked at the same time; heavy castings should not be baked with thin sheet metal.

A certain amount of heat is required to bring an ovenful of work to a given temperature. Depending upon the weight of the metal, the quantity of work and the type of oven, different lengths of time will be necessary to accomplish this. In other words, more time should be given in baking an ovenful of work than if the oven is only partially filled. This should be borne in mind if uniform results are expected. Otherwise, the finish may be underbaked at times and overbaked at others.

All baking japans usually give good results if baked at a higher temperature and for a shorter time than that ordinarily used. Roughly, the following table gives the relation between these various times and temperatures:

Temperature in Degrees F.	Time Hours		
250	2½		
300	2	3	
360	1	2	3½
400	½	1	2½
450		½	1

It is usually safe to raise the temperature and shorten the time, but it is not always safe to lower the temperature and lengthen the time. In other words, some japans that take on a hard, glass-like surface in one hour at 400-deg. F. could never be made to harden out thoroughly with any amount of baking at 200 or 250-deg. F.

Oven Ventilation

The ventilation of the oven should be watched carefully. When an oven is constantly filled with fumes or smoke the proper luster is not obtained on the finished work. The surface is apt to have a cloudy or smoky appearance and doubly apt to be covered with little specks of dirt. In addition, there is great danger from explosion and fire in many cases, under these conditions.

If articles to be bake-finished are crowded in an improperly ventilated oven some of them are sure to come out underbaked, particularly in spots. Generally what is hung near the walls will be baked out nicely, while the work in the center of the oven will be soft. Under conditions of poor ventilation the fumes are sometimes so heavy that the finish is wiped entirely off the edges of some articles. The japan must have air to bake out properly.

Troubles caused by lack of proper ventilation can be overcome to some extent by hanging the articles farther apart and also by running the heat up very slowly.

The japan must be used at the same consistency at all times on similar work, to get proper results. If it is used heavier, more heat will be required to bake it hard and it will have a higher luster than when it is used thinner. If the japan is used too thin it will not properly cover the seams and edges; it is likely to bake out brittle, and the luster will be decreased.

Hydrometer Tests

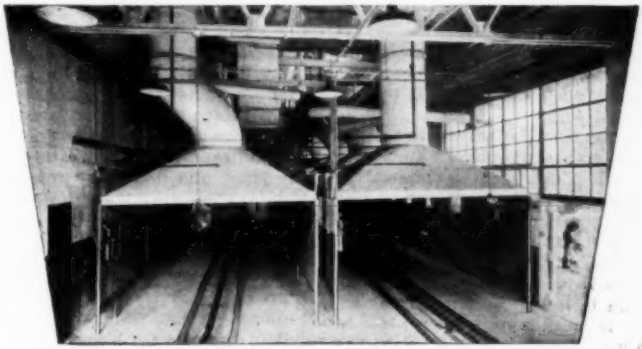
The real systematic and energetic japanner will use a hydrometer in testing his japan to keep it at the right Baume reading all the time. This is no hard task, since it takes only a few minutes at night or in the morning. It is better to add the necessary thinners each night so the japan will have a chance to set all night and become thoroughly mixed. This also gives any dirt a chance to settle to the bottom of the dip tank before work is resumed the next morning.

It should be thoroughly understood that the thickness, body, or viscosity of a japan has nothing to do, necessarily, with its Baume reading or specific gravity. Viscosity is the resistance offered by a fluid to the relative motion of its particles; in other words, it is the resistance to flowing. The Baume reading, or specific gravity is an expression of the relative weight of a given volume of the japan to the same volume of water.

Japan Thinners

In general, petroleum naphthas are the best materials for thinning

These Facilities will Reduce *Your Painting Costs* Too . .



Mahon Tunnel Type Spray Booths in operation over conveyor production lines in an automobile body plant

Mahon Spray Booths, installed in hundreds of manufacturing and refinishing plants throughout the world, are serving many diversified industries . . . each an individual installation, designed and installed to produce maximum efficiency in conjunction with the particular product to be painted. Of first consideration in the design of this equipment is facilitation of rapid, efficient production . . improved working conditions for workmen . . fire safety and low maintenance of equipment. No matter what you paint, from a small casting to a railroad box car or passenger coach, you can do it in less time and do it more efficiently in a Mahon Spray Booth. Mahon engineers have specialized in the scientific development of Spray Booths for every industry . . . the wide and varied experience of these Spray Booth specialists is available to you in the solution of your Spray Booth problems. Do not hesitate to call in a Mahon expert. Consultation will not place you under any obligation.

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Manufacturers of Spray Booths and Exhaust Stacks, Industrial Drying Ovens and Blow Pipe Systems.

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baking japans, although there are some cases where a small proportion of coal tar naphtha gives certain desirable qualities to a thinner. The lighter naphthas should be used where small parts are being coated, but on larger articles it is usually necessary to use the heavier, slower-evaporating naphthas in order to keep the japan "open" and allow it to flow freely.

Care must be taken that there is no grease, paraffine, water, acid, or other detrimental material in the reducer. An easy way to test for grease is to flow a small amount of the material in question on a clean white paper and allow it to evaporate; if a greasy stain is left after an hour or so, the reducer is not safe for use in japans, other than those baked at very high temperatures.

Water can be removed from a reducer by straining it through a chamois skin. Paraffine can be detected by cooling a small sample of the reducer to about 30-deg. F.; if any white specks appear, do not use it in japan. Test for acid and alkali with litmus paper or some other indicator.

The safe method in choosing a reducer is to let the manufacturer of the japan supply the reducer also. He is in a better position than anyone to know what is best to use for thinning down his japans.

Avoid Cold Metal

Warm japan should never be sprayed or dipped on cold metal articles—especially if the temperature of the metal is below 70-deg. F. If the metal is a great deal colder than the japan, the japan may become chilled before it has flowed off sufficiently and thus cause trouble with runs and sags. The temperature of the japan and of the metal should be around 70 to 75-deg. F. at the time of application to secure the best results.

This should not be taken to mean that it is never advisable to warm the japan before applying it. Certain types of work make it necessary for the temperature of the japan to be higher than that of the metal. In these cases, however, it should be borne in mind that the metal should not have a temperature lower than 70-deg. F. The best results are always obtained when the temperature of the japan and the metal to which it is applied are about the same.

Avoid Cold Japan

While dealing with temperatures, it is advisable to note that reducers or japans should not be left in the cold for a great length of time before being used. If a reducer is left outside on a cold night and then used the following morning, the japan is likely to become chilled until it will not flow out properly. This can be partially overcome by mixing the reducer and the japan before quitting work for the day, so the mixture will have a chance to come to a uniform temperature before the next morning. Even so, the cold may solidify small particles in the reducer and cause trouble, such as pitting or other defects.

It is even more dangerous to store japan in the cold. Certain reactions are likely to occur, under such conditions, that will cause a perfectly good japan to give bad results on the work. Pitting of japan can often be traced to the fact that it was allowed to become thoroughly chilled while still standing in the drums. In such cases I have found that usually the pitting can be removed by warming the japan. This can be done easily by plac-

ing the drum on a steam coil or by putting a tightly jointed steam coil in the japan. Usually 150-deg. F. is sufficient heat to accomplish the purpose.

It has been my observation that the majority of troubles encountered in the use of finishing materials can be traced back to local conditions, such as faulty methods of handling the articles before or after they are coated. Once the cause is located it can usually be removed easily, and the fault remedied.

Electric Light Fixtures In Modern Color

Until recently electric light fixtures were made up entirely in a metal finish with but little color. Today the majority of them are being finished in color. The reason for this is mainly the present color trend. All homes are being decorated with color, therefore in order that the electric fixtures may not appear out of place, color must be employed in their decoration too, and this is being done very effectively.

An old brass fixture finished in color appears like a new article of much greater value. With the proper use of color, a fixture made of thin brass may be made to appear as sturdy as the old solid iron fixture, and at the same time it may be made attractive and in harmony with everything else in the room—which is something that the old metal fixtures occasionally failed to do.

Some of the combinations that the writer has found particularly pleasing are as follows:

1—Black and rich cream smutted with Van Dyke brown.

2—Pastel green and pastel tan with a smut of burnt sienna.

Oakite-Cleaned surfaces assure a better finish

BY CLEANING metal surfaces the Oakite way, before japanning or painting, you can be certain that a better, more uniform finish will be secured.

Oakite materials and methods leave metal surfaces free from every trace of dirt and film; remove the foreign matter which later may cause specks, blotches and dull streaks. And Oakite cleaning does its work in so much less time, without the need for tedious scrubbing and scraping.

One of our Service Men will gladly tell you about Oakite cleaning for every phase of your work. Write us and he will call. No obligation.

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OAKITE PRODUCTS, INC., 32 F Thames St.
NEW YORK, N. Y.

OAKITE
Industrial Cleaning Materials and Methods

3—Light blue, light green and ivory with a burnt sienna smut.

4—Light ivory, or white with some black trim, smutted with raw sienna. This gives a finish closely resembling real ivory.

For the benefit of those who do not know what "smut" is, the following definition is given:

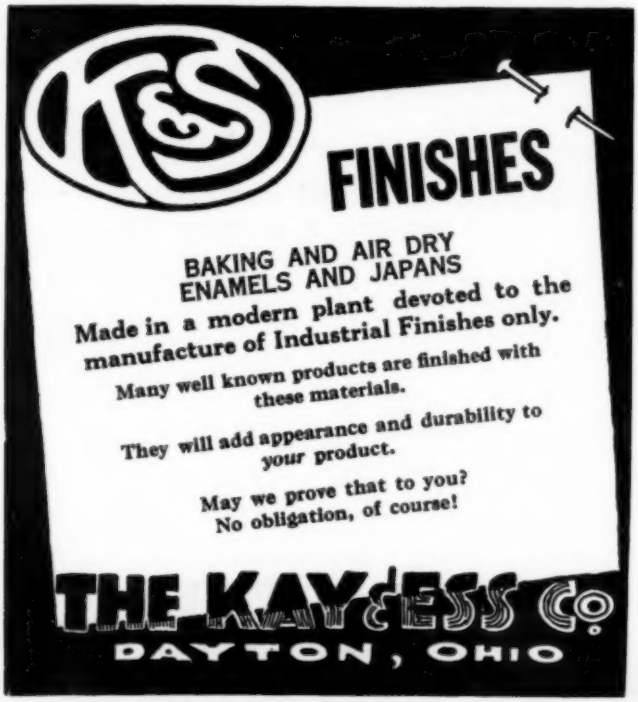
Smut is a color ground in japan or oil (the former being preferable), thinned with equal parts of turpentine or benzine, plus a little boiled linseed oil and japan drier. A coat of this mixture is brushed on the colored article and when the mixture has started to set, the high lights are wiped off. —Joseph M. Verderosa.

Lettering Electric Lights

Some time ago an item appeared in the Questions and Answers section of INDUSTRIAL FINISHING asking how to make lettering stick to electric light globes; it stated that the inquirer had had trouble with the paint peeling after same had been applied and subjected to heat for a certain length of time.

I submit two methods of applying these letters so that they will be permanent and satisfactory:

First, do the lettering with baking enamel or black japan; then turn on the light. It will "bake"


FINISHES
BAKING AND AIR DRY
ENAMELS AND JAPANS
Made in a modern plant devoted to the manufacture of Industrial Finishes only.
Many well known products are finished with these materials.
They will add appearance and durability to your product.
May we prove that to you?
No obligation, of course!
THE KAY & ESS CO.
DAYTON, OHIO

right there. I've tried it and it works fine.

Second, letter it with china paint and take it to some one who does china firing. About the only way to wreck a job of this kind is to break it. However, be sure of your material first; some articles will melt at about 850-deg. F.—others at 1800-deg. F.—F. Mannhardt.

A Fountain of Information The Finish Salesman

There is a great difference in the reception accorded the material manufacturer's salesmen in the different plants where they call. The medium and large-quantity users of finishing materials receive the attention of salesmen from several manufacturers. In some plants the salesman is regarded in an entirely different light than he is in others. In some he is a nuisance, there for the sole purpose of wasting someone's time and boring the purchasing agent, the superintendent, and if he gets that far, the foreman finisher.

In other plants he represents a menace, for is he not there to change the materials used, to put in a new system and to disrupt things in general? There is a fear in the finishing department that he actually will get an order!

In others the salesman is welcomed; he is given an intelligent hearing, invited to go through the plant and encouraged to make suggestions and ask questions. Let us compare the two methods as to the points involved.

The reliable manufacturer picks his men with care. He wants a man in whom he can see the personality of his firm represented. The salesman for such a concern is sometimes one who has had technical training, and often he is a practical finisher whose experience has been greatly broadened by his inspection of many finishing departments. He is a man selected because of his qualifications for this particular job. A big organization is behind him, and this organization has trained him according to its code of ethics and equipped him with the knowledge that it wants him to extend to the customer, both about the line and concerning general finishing methods.

Let us also consider the salesman as to education gained from his contact with finishers and executives in his territory, from visits to different plants, and the store of specific information that he has accumulated from the very nature of his job. The salesman becomes a pretty well informed individual after all is said and done.

Give the salesman a chance. How do you suppose that he gets his information? His job is not one of receiving discourtesies, but one of co-operation. He comes to you with the latest. Send him direct to the foreman. Oftentimes a salesman saves a firm thousands of dollars. It does no harm to listen to him at any rate; pick out the good, throw out the bad! But give the salesman and the foreman a chance to get acquainted. Everything counts!—M. F. Hardt.

A prominent automobile manufacturer recently held an exhibition of his new models in conjunction with a display of the paintings of the old masters. It was pointed out that the color basis of the new machines were inspired by and taken from the canvasses of genius.

Liquids and Retarders for Bronzing Lacquers

Superintendent of finishing in large radio factory explains in detail the testing, selection and proper use of bronze finishes employed to add decorative effects to the baked wrinkle finish that characterizes some of the metal radio cabinets

By Joseph F. Schmoegner

THE APPLICATION of a colored lacquer over a wrinkle-finished surface has been discussed in my previous article,* but I am of the opinion that the use of bronzes, bronzing liquids and retarders should be mentioned in an article by itself.

The bronze finish can be effectively applied over a surface that has been lacquered in color, the bronze being put on only certain parts to add attractiveness and individuality to the article. Where surfaces are embossed in a panel effect, the depressed portion of paneling should be bronzed, and the raised parts should remain in colored lacquer.

If we expect faultless work executed in this manner, we must spray an even-colored lacquer coat all over the article to be decorated; that is, the parts that are to receive a gold bronze panel later on must have a solid coat of colored lacquer also. If we neglect this and only mist coat those parts that are to be bronzed, we invite a lot of unnecessary difficulty. A partly sprayed colored lacquer under a bronzing coat will show considerable shadow which the finisher never will be able to rectify, no matter how many coats of bronzing lacquer he sprays on.

*March issue, page 32.

In order to turn out a satisfactory paneling job, we must have properly designed masking jigs. Our entire production depends on their correctness and dependability. The application of bronzes, if properly mixed, is a simple operation—provided we bear in mind a few simple rules and select our material carefully.

Testing Powders and Liquids

Bronze powders should be chemically clean, uniform, and powdered fine enough so that they will not clog the finest nozzle of a spray gun. A very simple test that will determine the presence of oil in gold bronzes is as follows: To make a double check, use two liquids that dissolve oil. First, a good lacquer thinner; second, carbon tetra chloride.

An equal amount of bronze powder is put in separate test tubes approximately one quarter full. Add to one tube lacquer thinner; to the other the carbon tetra chloride. Shake each tube vigorously until the bronzes are thoroughly washed and liberated from oil or other impurities soluable in either liquid. After bronze powders have settled, the clear liquids are poured into a tumbler of water. Since water will not mix with oil, it will separate any trace of oil that may have been

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Armitage ARMORLAC LACQUERS VARNISHES ENAMELS

Bakes in

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The most *adhesive*, *toughest* primer ever made! It becomes part of the metal itself

Made in Colors and White

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Gentlemen:

Send us the details of your A R X Metal Primer as advertised in Industrial Finishing.

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in either liquid. Carbon tetra chloride, being heavier than water, will settle to the bottom of the tumbler, while any trace of oil will remain on its surface.

While conducting this experiment we note that bronzing powders in carbon tetra chloride will remain in suspension longer than in thinner. This is a valuable standard to check up various thinners as to their capability to keep bronze powders in suspension longer than others.

Bronzing liquids are just as important as bronze powders and should be selected with the same care. A well formulated bronzing liquid should be pale in color, fairly heavy-bodied, and should not blush any more in humid weather than a good grade of colored lacquer. Mixed with bronzing powders, it should keep bronzes in suspension for a reasonable length of time and, last but not least, it should not discolor in a mixed state within ten hours.

If you have a bronzing liquid with the above qualifications you should have fairly good material to start work with. Bronzing liquids should be free from benzol. A reputable manufacturer will never use benzol as a solvent for spraying material. Its use is detrimental to the health of spray operators, and it should be barred from every finishing department.

Paleness of color is another factor to be taken into consideration. A pale, almost colorless lacquer is bound to give us the true color of bronzing powder, while that of darker shades such as amber, or a shade resembling oil, will yield a much yellower or redder hue. This change in color is often blamed on bronzing powders, but the actual cause is in the bronzing liquid itself.

From the standpoint of economy the amount of bronze per weight used in a gallon of liquid, is worthy of experimentation. As little as 1-lb. 7-oz. of powder to a gallon will give satisfactory results, providing we use low pressure on our spraying equipment. A rather dry coat will give us the desired results over a wrinkle finish, with very little waste of material. Proper and continuous agitation is very important, due to the rapid settling of heavy bronze powders.

Blushing; Retarders

Blushing is almost certain to occur in humid weather, and excessive blushing should be rectified through the use of heated rooms, rather than the extreme use of retarders. While the use of retarders in small quantities is advisable, we are often tempted to increase the proper amount that has been recommended.

An excessive use of retarder will often cause a lot of unexpected difficulty. A six percent addition of high-grade retarder should check ordinary blushing. There are several good reasons why an excessive use of retarder should be avoided, especially over wrinkled finish surfaces.

Supposing we are troubled with blushing! Our first remedy being retarder, we add some to our bronzing batch. In doing so we decrease the viscosity of bronzing liquid, and consequently lessen the hiding qualities of our material. This is very noticeable over a wrinkled surface, the high portions being incapable of holding the low viscous material, consequently the heavy bronze runs down to the low portions of the wrinkle surface and exposes the high portions to such an extent, that the undercoating will show through. An increase of bronzing powder, of course, will be necessary to overcome this difficulty.

Finish Must Dry Rapidly

Bronzing liquids are made to dry rapidly, in order to set the floating bronze particles at their best advantages—that is, while they are afloat. The addition of retarders will have a tendency to darken bronzes, allowing the bronzing liquids to stay in a wet state long enough for bronze particles to settle to the low places, thereby sacrificing their brilliancy.

There is yet one more point to be mentioned, which will cause bronzes to darken—that is if the slow-drying qualities of retarders keeps the lacquer coating wet long enough to soften the wrinkle varnish to such an extent, that the wrinkle varnish coating breaks down completely under the lacquer solvent's action.

The Baked Finish

To safeguard ourselves in that respect we should have a periodical check on baked wrinkle-finished articles. Immersing articles in thinner with a six percent addition of retarder, would show us if the wrinkle varnish will soften under its action. If properly baked, and immersed in the above mixture—and if evaporation takes place—wrinkle varnish should be so hard as not to yield under a fingernail scratch. Again, it should not be baked too hard, so that the above mixture will have no effect upon its surface, thereby sacrificing a proper bond between undercoat and lacquer.

I have discovered that some wrinkle varnishes are very critical as to their baking point. A good wrinkle varnish should give us a fluctuation of 25 deg. Within these limits it should be baked neither too hard nor too soft, and it should stand the previously mentioned thinner test.

All of the above experiences and observations dealing with wrinkle varnishes, lacquer, bronzing liquids, bronzes and retarders, are the result of 1,000,000 finished radio cabinets, and I hope that some of the points mentioned in these articles may be useful to the readers of this wonderful magazine.

Colors by their arrangement, can either cut up an article or unite it, as to appearance.

Gast Announces New Spray Outfit

Gast Mfg. Corp., (spray equipment, compressors, air separators), Bridgman, Mich., announces a new portable spray painting outfit which weighs only 75-lbs. The power of this outfit may be judged from the fact that it delivers continuously 5 cubic ft. of air to the nozzle.

Complete information about the new portable spray outfit is presented in a new illustrated book just off the press, entitled, "Air Painting at Its Best."

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Automotive Refinishing Colors

Director of Duco Color Advisory Service names several popular colors and explains how to choose suitable colors for the purpose of presenting attractive harmonies in refinished automobiles

By Howard Ketcham

AUTOMOBILE manufacturers today present their cars in a wide range of carefully chosen color harmonies, and motor car buyers can take the kind that suits them best. When it comes to having the car refinished, however, the owner strikes out for himself.

There are certain basic facts about color and the effect of one color on another that must be understood, but these facts are not difficult to learn. For instance, light and cool tints of colors such as Brocatelle green, Nyanza green, Verdancia green, Mountain Mist blue which is a blue with considerable gray in it, Storm Cloud blue, Gray Gull, a dark beige, and blue gray make objects easier to see by making them look larger. On the other hand, dark and warm shades of colors such as Safari blue, Thorne brown, Mountain brown dark, Maison gray, Rendezvous gray, Dusk rose and cinnamon make things less noticeable and hence they appear smaller.

Contrasts among warm colors are less noticeable than with the combination of a warm and a cold color. Shades and tints of the same color always look well together. So, in combinations where yellow, green and wine-maroon are used together, green and yellow, provided they are in right tones, may be used in perfect harmony. A wine-maroon automobile with yellow-green wire wheels, green window reveals and a yellow-gold stripe on the mouldings would be attractive because these colors harmonize and are distributed in right proportions.

New Tints; Combinations

It is natural for one to desire exclusive tints and shades of attractive colors when refinishing. These can be readily developed in a way to give the owner something special and individual. They should be colors that will lend themselves to the environment and personalities with which they will be in almost constant association. Oftentimes the very names of the colors will serve as guides, and if one takes a fancy to a color combination that seems a little bold, the colors can be made to melt agreeably into a perfect picture by mixing a little of each with the other.

Combinations of colors associated in the spectrum are likely to please and rest the eye, and for this reason they are the ones that are most used. Like good friends, they wear well together. A color harmony can usually be achieved with two disassociated colors by adding black, gray or white to each, or adding black to one and white to the other.

So brown harmonizes with orange or mauve, crimson harmonizes with green, gray with lav-

ender, orange with blue, old rose with any blue, and yellow with blue and green.

The amount of each color to be used is a matter of personal preference. The parts of the car most suitable for contrasting color treatment are pretty generally understood now, such as the wheels, the bandings, the window reveals, the hood, etc. Remember that color used horizontally adds apparent length to the car, while up and down lines seem to shorten the wheel base and give the car height.

More Brilliance

The trend this year is for more brilliance and richness in coloring; combinations that once would have been thought daring are now, with a better understanding of the way to combine colors on automobiles, merely productive of new and more charming harmonies without anything to grate on the eye.

Some attractive sport phaetons are being finished this year in aluminum with the polish accentuated by a covering of clear lacquer to protect and add lustre. They are often upholstered in black and red and trimmed, on fenders and mouldings, with Mountain Ash scarlet or Red Shadow, which is a yellowish red. These go well with black and aluminum. But the actual polished aluminum is hard to keep in good condition and its use except in special circumstances hardly practical.

Glistening white on certain articles suggests cleanliness; other attributes also can be produced as faithfully through this medium of color. Is it comfort, strength, safety, warmth or coolness that you want your product to symbolize?

Lacquer Spraying Hazards and Safeguards

(Continued from page 27)

booths are of our own design and construction, free from corners which collect dust and handicap cleaning. The two exhaust pipes lead out from back of booth in the center, the lowest one being 2 ft. from the floor and the other directly above it.

Each exhaust fan is run by a 1-h.p. motor, 1800-r.p.m.

This arrangement keeps the booth free of vapor. Each booth has seven baffle plates which distribute the exhaust evenly. The top of the booth in front extends out 3 ft. from the booth proper. In case of fire this extension helps to control the flames from interior of booth circling top, and also helps to confine vapors to the booth when spraying large surfaces or bulky articles, such as is most of our work.

Prevents Fire Spreading

Across the top of the booth in front there is an 8-in. in width splash pan, two sprinkler heads being located directly behind this pan. The purpose of the splash apron is to confine the water to the interior of the booth; also to cause it to form a curtain covering the entire opening. Directly in front of this splash apron there is rolled upon a heavy wooden roller an asbestos curtain.

This curtain when unrolled closes the entire front opening of the booth. It is held in its rolled-up position with one strand of wire having in the center a 150-deg. F. fusible link. With the fans running, the curtain unrolled and water coming from two sprinkler heads, fire hasn't much of a chance, because the fans create a vacuum which helps to smother the flames.

In the immediate vicinity of the booth overhead are ten sprinkler heads which cover the entire space occupied by the booth. All spray booths are placed 3 ft. or more from the side wall of the building. This allows ample space for cleaning which is very important. Many times you will find spray booths constructed close to the walls of the building. This creates a fire hazard as the small space does not afford sufficient room to clean properly.

The switch boxes controlling the motors on the booth are 15 ft. from the booth; they are the enclosed type, vapor proof; drum lights furnish illumination when necessary.

All electric wires in this room are properly insulated and inspected periodically.

Use Automatic Equipment

Automatic fire equipment is positively the only equipment worth considering as protection for a lacquer spray booth. The reason is as follows: A fire on a lacquer spray booth confined in a room where the intense heat and dense smoke from burning lacquer dust cannot escape, makes it impossible to use hand operated equipment. If you believe it is possible to fight a lacquer booth fire confined in a room, by using hand operated extinguishers, you are deceived; experience will teach you decidedly different. You may construct a booth in a large lot and successfully extinguish a fire with this type of equipment, but try it in an enclosed room!

Again, if there is a fire where ventilation is poor and there exists an explosive condition due to vapor and dust, there will be no need of any fire-fighting equipment, for the explosion which will occur will be the grand finale. The expenditure of a few hundred dollars will furnish a ventilating system for a lacquer room that will be as safe as properly-insulated electric equipment.

Ventilation of the described type is not a positive guarantee from fire, but if properly installed it is a guarantee from there being an explosion in case of fire. Without an explosion, a lacquer fire is no different than any other type of factory fire, of which there are many. Without an explosion the fire equipment, such as sprinklers, has an opportunity to function.

Knowledge that is acquired as to danger of electricity or lacquer when used improperly will avail nothing unless placed in practical use.

The summary of the condition is as follows: If it is possible, do not use lacquers containing benzole without ventilation, and lots of it. It is dangerous to all who work within its fumes. If your factory hasn't proper ventilation in lacquering departments, have this condition remedied, and in case of fire—small or large—many dollars will be saved and a healthy atmosphere will be created in which to work.

With this protection and good housekeeping, the fire hazard which is connected with lacquer is reduced to a minimum.

More Bronze Powder

Announcement has been made by the Aluminum Company of America of the immediate construction of a new aluminum bronze powder mill at the Alcoa, Tennessee plant.

The erection of this mill has been found necessary to take care of the rapidly increasing demand for aluminum bronze powder for use as a paint pigment. New uses for aluminum paint have increased consumption over five hundred percent in the last eight years.

QUESTIONS AND ANSWERS

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

Lacquer Harmed by Low Temperatures?

Referring to a question that recently came up as to whether or not it is harmful for lacquer to be stored in metal drums and subjected to freezing weather, I would hesitate about answering this question one way or the other. It is a known fact that varnishes, when subjected to freezing weather, are harmed to the extent that their use produces unsatisfactory results in the final finish. The same might be true to some extent in the case of lacquer.

The outstanding feature that brings this comparison of the effect of freezing temperatures on varnish and lacquer to my mind, is the fact that when a coal tar product of a benzol nature is used as a reducing medium in connection with the manufactured lacquer product, and in view of its high freezing point which is somewhere around 32-deg. F., that there will be a precipitation of the nitro-cellulose contents constituting the lacquer, due to the formation of ice crystals through the medium of benzol freezing.

This, then, would cause a disrupture of the general structure of a lacquer and would in some respects be harmful. To overcome this feature, a general recommendation given to users of a lacquer is to place the drums in storage and not on the line in a semi-heated storeroom, and gradually bring them up to room temperature step by step, until they are controlled at the required temperature of the finishing room. At this temperature, which is usually around 70-deg. F. the lacquer will work very well and should not produce any disastrous results.—J. C. Alsee.

Finishing Punched Metal Stampings

On page 87 of February issue, I notice W. Mfg. Co., asks for information about how to finish small metal stampings that are punched. If the quantity will not justify the purchase of a dipping machine, I suggest racking the pieces in multiple and spray finishing them. I would have several special racks made up as follows:

Purchase several gross of No. 14 or 16 screw blanks. These can be obtained from a manufacturer of wood screws. These blanks will have no screw driver slots nor screw threads, but they will be pointed. They should be about 3 or 4 in. long. Obtain several straight planed boards about ¾ in. thick, 6 in. wide and 3 ft. long.

To locate the holes for the screw blanks, place the metal stampings on one of these boards so the stampings will lay within ½ in. of each other all around and then mark through the

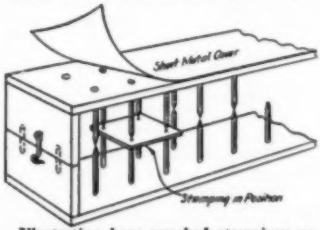
punched holes. Bore holes in this board to receive the screw blanks for a tight press fit. Then use this board as a template or guide for boring holes in all the other boards. When all are drilled and the metal pegs are put in, the holes in the stampings will fit over the points of the pegs, as shown in the accompanying drawing. To complete the racks, end pieces are put on and fitted up as shown in the drawing.

Now while the metal stampings are supported on the projecting pegs of one of these open racks, one side can be sprayed easily enough. But to spray the other side immediately thereafter, without handling the stampings individually, is the problem. To accomplish this, I propose to make the open racks in pairs so that two will fit together perfectly and can be clamped in the position shown while the entire unit is turned over to let the stampings turn over and transfer themselves onto the pointed ends of the corresponding pegs in the duplicate rack. All that remains, after the unit is turned over, is to release the hooks and lift off the rack on top, thereby presenting the other side of the stampings ready for spraying.

Inspection of this drawing reveals the necessity of accuracy in construction to the extent that the sharp points of the corresponding pegs meet exactly on center. The end pieces of each rack are bored for dowels or guide pins to make the racks fit together properly, and each end is provided with a small hook to use in clamping the two halves of a complete unit together.

The two racks to pair up together should be numbered or lettered to identify them so they will always be used together. The backs of the racks are covered with sheet metal to hold the pegs in place and to permit easy cleaning.

A girl or boy loads the racks with the metal stampings and passes the loaded racks to the spray man who sprays them with



Illustrating how punched stampings are supported by pointed ends of pegs and how they can be quickly reversed and placed on another rack.

black japan, enamel or lacquer. The helper then places the mate to this rack over it, hooks the latches and turns the pair of racks over, to turn over the stampings and transfer them onto the other rack. When both sides of the stampings have been spray finished the stampings can be left on the last rack until the finish dries either by air drying or oven drying, according to the material used. The volume of production will be governed by the number of pairs of racks provided and the amount of cheap help available to load and unload these racks.

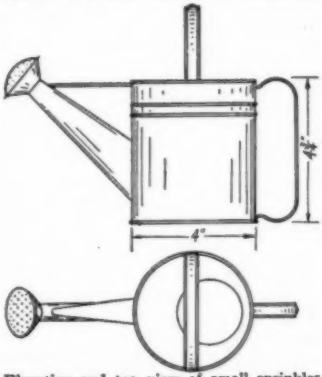
Care should be used in handling these racks so as to avoid changing the perfect alignment of the pegs, as they must always fit the stampings. When this contract is completed the same pegs can perhaps be used in the construction of other racks for similar articles.

There will be very little waste of material from overspray, since the small metal stampings will form almost a continuous surface of area equal to that of each rack. —Lee Conner.

Finishing Sprinkling Cans

We are interested in what would be the best production figure for spraying juvenile sprinkling cans (such as that illustrated in the accompanying drawing). In other words, how many of these sprinklers should be sprayed per hour.

We would like to have the production figure in spraying this sprinkling can on plain, uncoated



Elevation and top view of small sprinkler can.

metal, and also on spraying over pails finished like these samples we are sending you. In other words, we would like to have figures on spraying new cans and re-coloring old ones, that have already been coated.—W. S. & M. Co.

Editor's Note: Only the outside of the main cylindrical container is in solid color—as for example, red, blue, etc. The remainder of the surfaces appear to be finished with an amber-tinted clear varnish or lacquer, the metal seeming to be a light brass color. Looks to us as though the sheet metal had been finished before assembly of parts which are joined together by press crimping in some places, and by soldering in others.

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Our No. X-C. 100 P-X. Oxide Surfacer is heavy bodied, requiring a fifty-fifty reduction and is ground fine in pebble mills to give a smooth surface when sprayed. It requires little sanding to surface ready to lacquer over. There is no swelling of undercoat when lacquer is applied; therefore, no shrinkage in file and surfacing marks after the finish is completed.

A trial order of these goods will convince the most critical and make you more friendly with our line.

Manufactured by

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1251 Marquette St. Cleveland, O.

With a few special appliances, a spray man and two handy boys or girls, I think the toy sprinkling cans could be handled and finished at the rate of about 500 per hour.

Since this article is assembled and must remain so, I would suggest using a low viscosity lacquer —one that is solid covering and very opaque. About ten of these cans should be placed on a board and one side sprayed, shooting at them broadside with about 40 to 50-lbs. pressure. The handles and spout on each can should receive attention first, with less pressure on the trigger and a full flowing coat on the large portions of can—doing the top but leaving the bottom go unfinished, or with its present finish.

This board is placed on the spray-booth turntable and when the cans have been sprayed on one side, the entire outfit is turned around to present the unfinished sides for completion of the spraying. Some trouble may be experienced on account of the weight of the cans, as the required spraying pressure may disturb them or blow them over. It may be necessary to weight them down or hold them down with a set of magnets positioned under the rack. Further along in this paper I will submit suggestions in detail about how to hold the cans while they are being sprayed.

Really the time-consuming part of the spraying job will be the coating of the spout and handles, especially the undersides of these parts. I would suggest spraying only the main body or can proper, using a non-bleeding color, and then finishing the handles and spouts by dipping. A contrasting color used for these projecting parts would make an attractive little article.

After the body of the can has

been spray finished and the finish has dried I suggest dipping the top handle first, following up by dipping the spout and its brace; hang the cans up by the side handle and let this dipped finish dry. Then dip the side handle and hang up each can by its spout. Provide a separate dip tank for each operation and have only enough material in tanks to permit parts to be coated to within ¼ to ⅜-in. of the body of the can. This or some other arrangement is practically necessary to make the dipping operation safe and easy—to avoid the possibility of cans being let too far down into the material.

The dipping should be done as rapidly as one girl can pass the cans on to another. This method of finishing will produce a more attractive and saleable article; it will be neatly trimmed, and at no great expense, for if the spray operator gives his attention to spraying only the top and sides of each can, he should be able to spray them as fast as they can be placed on trays by three helpers.

The cost for labor will be in proportion to the amount of cheap help employed to load the racks and to the number of racks provided, so it is important to have plenty of racks available. The spraying will go along rapidly. The finishing material cost and the amount required will depend, of course, on what kind of material is used. One coat of suitable lacquer will cover the surfaces satisfactorily.

My idea in handling these cans is to arrange for spraying several of them at a time and to hold them down mechanically, having nothing in the way to interfere with or obstruct the spray or the spray operator. Otherwise, it would be very simple to hold each can down individually with a short piece of

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Orders are carefully filled and promptly shipped.

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Among the large variety of scraping knives that we carry, the ones listed here are very popular. They are made with a rosewood handle and are brass riveted. Very strong.

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2½ in.	$5.70	$.60	$6.40	$.65
3 in.	6.40	.65	7.00	.70
3½ in.	7.00	.70	8.00	.80
4 in.	8.00	.80	9.00	.90

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1. Will not bloom or blush, turn white or gray at any time, under any climatic or extreme weather condition.

2. Dries quickly, sands easily and allows for sanding one hour after application, if necessary.

3. Mixes to any degree with Pure Shellac. Can be reduced in body when necessary, with either Alcohol or our Special No. 300 Finishing Lac Reducer, which is only slightly more expensive than Alcohol. For first coat work we recommend a reduction of four parts of No. 300 to one part of Alcohol or our No. 300 Finishing Lac Reducer.

4. Economically it has an excellent covering capacity, and should be sprayed at about an 80 pound air pressure to obtain best results. It can be brushed or dipped if necessary.

5. Absolutely waterproof. Its remarkable sealing quality prevents bleeding when used over stain as a succeeding coat, and also prevents blooming, spotting and cracking where the water seeps thru any crack, edge or end wood.

6. As an undercoat, it will not crack under lacquer, varnish or shellac. As a final finish, it can be used over any type of stain, on any kind of wood with excellent results. A second coat can also be applied with excellent results one hour after the first coat has been applied, if necessary. Succeeding coats will also sand easily.

7. Adheres to metal and fabric as well as wood and can be used with equally good results under bronze on lamp stands as well as for coating muslin and other fabric lamp shades, etc.

8. It can be furnished in either Clear, Orange or Black.

We have obtained these facts from actual tests, in our laboratory, coupled with the many good reports we have received from customers we are now supplying, and we know that you, too, will find a working sample to be self-convincing on every point and the price of this item to be of interest.

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broom stick, putting it through the hole in the top of the can and pressing it against the bottom of the can inside, completing one can at a time—but this method would be slow and costly.

For spraying ten cans at a time, I suggest fastening ten old Ford magnets on a 1-in. board about 8 in. wide and long enough so that ten sprinkler cans can be placed in a row without touching each other.

Prepare another set of racks—say about ten or 20—with sheet metal tops large enough to cover the board that holds the magnets, allowing an extra 1 in. of width on each edge to which should be nailed edgewise a 1x2-in. strip of wood. One of these racks, when laid over the magnets, will completely cover and shield the magnets from overspray, yet the sheet metal rests directly on the magnets. The magnets hold the cans in place by magnetic attraction extending through the sheet metal.

To remove the racks the helper must slide them off endwise; he must not attempt to lift the tray of cans from the magnets. I have tested cans of this kind with a magnet and this method of holding them is okeh. Slide a finished tray full off and slide an unfinished tray full on. Each rack or metal tray should be cleaned of any material before being used again. For this purpose I suggest scraping it with a bronze scraper and wiping the surface with lacquer cleaner or thinner so that overspray will not collect and insulate the cans from the magnets.

These Ford magnets may be obtained cheaply at any junk dealer who deals in automobile parts. Pick out the ones that have some magnetism left in them.

If for any reason the magnet

device isn't desirable, the cans may be weighted down by dropping a small piece of metal inside each can and then removing same after the cans have been finished and are dry.

Another way to anchor the cans to the trays would be to solder on each metal tray, small short pieces of wire, the free end of each wire being raised enough to permit the low part of the side handle to be slipped under it. These spring catches will hold the cans securely enough to prevent their being blown over by air pressure from the spray gun. The wire catches, of course, must be spaced so the cans do not touch each other. The cans may be prevented from shifting by roughing the surface of the metal tray with a few punch marks suitably spaced.

The only part of the can that will be unexposed to the spray will be the bottom and the small portion where the wire clamp rests or presses against the handle; and this may be dipped quickly or retouched quickly with a small touch-up gun.—M. V. Leach.

A "relief" from color would not be a finish of 60 years ago, when so many products lacked an attractive finish; rather, it lies in the beautiful subdued shades of grays and blues, together with the popular black. But few potential customers are seeking "relief."

Each day sees more of the "old line" articles coming into the fold of color. The car and the home led the way, and now many office managers think of color harmony when buying new supplies and equipment.

A-LAC-O OIL and Pyroxylin Base

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for Wood or Metal

#300 Gray Metal Primer
#309 White Metal Primer
#311 Red Oxide Metal Primer

Dry to recoat in one hour

#301 Gray Wood Primer
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Dry to recoat in two hours

These primers combine the good qualities of the old oil base and pyroxylin primers—giving maximum elasticity, adhesion and durability.

All must be thinned at least 100 per cent for spraying.

If you are now using lacquer for finishing, these primers will prove a revelation to you!

Try them. You will agree that here at last, are some quick-drying primers that take the kink out of your finishers' troubles.

Details cheerfully furnished.

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Waterproof Floors in Spray Booths

Fire prevention, in connection with extra hazardous operations in finishing rooms, is giving insurance companies great concern.

The general use of lacquers may or may not be responsible for the increased fire loss sustained by practically all insurance companies carrying this type of risk; nevertheless many extremely heavy losses have been paid, and in almost every case the actual fire loss has been small compared to the water damage, caused by water from sprinkler heads and fire hose, ruining quantities of material in process and finished on floors below. This is a serious matter to the manufacturer as well as the insurance companies.

One requirement is the waterproofing of spray booth areas. Several methods are suggested. One, which is generally meeting the requirements, is a heavy duty plastic material, largely of asbestos and silica, which can be laid ½ to ¾-in. thick over mill type factory flooring, and secured with heavy reinforcing mesh. The surface is troweled to a smooth glass-like finish, making it easy to push furniture about during finishing, without damaging fragile legs.

This type of floor is finished with a 4-in. flashing at walls and columns, and at least a 2-in. ramp where it joins old floors, forming a sort of dish about the booth. Sufficient drains, usually 6 in. in diameter, are provided to carry off the water rapidly.

The usual recommendation is that the waterproofed area extend about 15 to 20 ft. in front of the booth, or about 2 ft. ouside of the area described by the draft curtains.

Where new spray booths are to be installed, it is suggested that this type of waterproofing be installed over a depressed area, thereby avoiding the use of ramps.

Installation of these floors are made by the W. J. O'Neill Floors, Inc. 166 W. Jackson Blvd., Chicago, Ill., this concern having been specialists in industrial floors since 1900. The floors are fireproof, quiet to the tread and easily cleaned. Many of the larger furniture and automobile body manufacturers have installed the O'Neill floors in their finishing departments.

New Portable Spray Painting Outfit

The DeVilbiss Co. of Toledo, Ohio, announces a new spray painting and finishing outfit "type NC-601," which "is the answer of the DeVilbiss organization to the

Can be operated from an ordinary electric-light socket.

demand from all trade and industrial classes for a dependable spray-painting and finishing outfit of easy portability, low price and absolute dependability."

This outfit is complete with air compressor, ready for use. It delivers a finely-atomized spray, adjustable from a round spray to a fan spray 3½ in. in width. This outfit weighs only 47½ lbs. It conforms in every way to the character, quality, and efficiency of the large DeVilbiss outfits.

New Portable Sander, Rubber, Buffer

The Stow Mfg. Co., Inc., (inventor and manufacturer of the Stow flexible shafts), Binghamton, N. Y., offers a new machine which is particularly interesting to industrial finishers. The outfit, as illustrated herewith, is known as the "Lindy" assembly, and it includes on the portable platform a ¼-h.p. motor which can be operated from a standard electric light line, a 3-speed drive, a clamp spindle, extension cord and plug, and a 5-ft. flexible shaft. This portable outfit is only slightly more than 2-ft. in height, and has regular speeds of 900, 1800 and 3600-r.p.m.

Larger models of the same

Economical Marketing

To make sales more easily than your competitor, a big portion of your effort must be accomplished through the finish on the merchandise.

BARRETT

Stains - Fillers
Pure Shellac Varnishes
Shellac Compounds
Shellac Substitutes

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Lacquer Primers Lacquer Enamels
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Meet the most rigid requirements and at a price you will regard as reasonable.

Accurate Control of All Operations Insures Highest Quality

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Originators of Dependable Finishes

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HENRY V. WALKER CO.
17 John St. New York

general design are equipped with ½ and 1-h.p. motors.

Among the rotary tools that can be used on the ends of the portable flexible shaft, there are included wire scratch brushes, sanding wheels, grinding wheels, buffing wheels and polishing wheels. These tools can be attached directly to the chuck at the end of the flexible shaft or to an angle head attached to the end of the flexible shaft.

Portable and has three speeds.

New Spray Gun

In announcing its new No. 8 spray gun, the Crown Spray Gun Mfg. Co., (mfrs. of spray painting equipment), 1218 Venice Blvd., Los Angeles, Calif., submits the following information:

"The No. 8 retains the outstanding Crown feature of an air nozzle fixed on the fluid nozzle for permanently perfect alignment, but has the added advantage of a tapered seat for self centering. The fan jets revolve independently of either nozzle, eliminating all danger of the usual wear of other designs. A broad, even, flat fan, free from splits or heavy center

is secured, and the shape is instantly changed to a round flow when needed.

"The fluid nozzles are made of stainless steel, with the inner nozzle hardened and accurately ground. All parts are perfectly interchangeable. The handy, positive air control valve permits instant regulation of the air to any desired working volume and pressure right at the gun. The plunger assembly is a new design

The new gun with aluminum container attached.

providing perfect alignment and very quick removal for cleaning as one piece.

"The handle and trigger grip are correctly designed for balance and comfortable fit in any size hand. The whole gun is light, exceptionally strong and beautifully finished.

"For gravity or pressure-feed containers the Model A is used. The cup-type gun is known as Model B, fitted with a 1½ pint all-aluminum container with quarter-turn broken-thread connection and wide mouth permitting easy cleaning."

LIGHTNIN

PORTABLE MIXERS

Non-spark, totally enclosed, self-ventilated MOTOR

Makes the "Lightnin" Mixer a safe unit for mixing lacquers, enamels, surfaces, primers, etc.

Portable—Clamp on Any Tank

No Installation Expense

Try One Without Obligation

All Sizes and Speeds

PATENTED

MIXING EQUIPMENT CO., INC.
229 East 38th St. New York

EASY NOW TO REPAIR DAMAGED FINISHES

Permanent repairs are easily and quickly made with Campbell's Stick Shellac. No use to lower prices because of damage—or to incur big expense of refinishing.

CAMPBELL'S STICK SHELLAC

Campbell's Stick Shellac easily restores scarred and scratched finishes to perfect condition. It is melted into the hole, dent or scratch and then rubbed down and polished. It is truly an ideal way to economically repair damaged finishes.

UNIVERSALLY USED

A color card of Campbell's Stick Shellac will be sent free to anyone upon request. Shows actual samples of the Shellac and the range of 54 different colors. Write for one today.

The M. L. CAMPBELL CO.
1007 W. 8th St. Kansas City, Mo.

A Suggestion

Surely any first-class finisher is open to suggestions that pertain to his particular business.

You are constantly being bothered with the clouds of gritty dust, that are caused by the wearing away of your cement floors, falling on articles just finished.

You, no doubt, have been troubled with this condition all through your plant; if so, our suggestion to you is to apply a coat or two of FRENCH'S CEMENT FLOOR PAINT, and your troubles are at an end.

FRENCH'S CEMENT FLOOR PAINT is made in ten attractive shades, is easy to apply, water-proof and after being applied flows to an enamel-like finish and gives your floor that easy-to-keep-clean high lustre.

FRENCH'S CEMENT FLOOR PAINT not only stops dusting of the floors, but prevents dampness appearing on the same, and last but not least, stops disintegration which of course figures to a great extent in your building up-keep program.

FRENCH'S CEMENT FLOOR PAINT is a scientifically prepared paint developed and manufactured exclusively by Samuel H. French & Company, Philadelphia, Pa.

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F. O. S.

is the

MASKING TAPE

you have been looking for.

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Send for free sample and prices

The Consumers Rubber Co.

1302-04-06 Ontario St.

Cleveland

Portable Ventilating Fan

The Meier Electric & Machine Co., 136 South Meridian St., Indianapolis, Ind., announces an interesting line of "Nu-Air" fans for various industrial uses. According to the company's literature:

"The multiple blade propeller used on Meier Nu-Air fans is the result of the latest developments

Portable electric fan with 27-in. propeller.

in aeronautical science and is similar in design to those used on large airships and planes. Exhaustive tests prove that this type of propeller moves an enormous volume of air with minimum power.

"These fans were especially designed for use in mills and factories where employes work in excessive temperatures. The 27-

in. 'Man Cooler,' illustrated herewith, is made completely of aluminum with the exception of the wire guard which protects the front and back of the fan. The motor is full ball-bearing and completely enclosed. The fan is adjustable in a vertical plane. Because of its light weight it can easily be moved about the plant by one or two men.

"In addition to its use as a 'Man Cooler' it is very effective for air exhausting and air-drying purposes. The six blade 27-in. 'Man Cooler' moves 9,225-cu. ft. per minute."

The cylindrical casing around the fan has a sliding door which can be opened to permit of cleaning the fan blades. When closed the sliding door can be locked to prevent tampering with the propeller. A hinge joint in the supporting pedestal allows the fan to be tilted.

Copper Pigmented Paints

The Copper-Primer Corp., 271 Madison Ave., New York City, announces a new series of copper pigmented paints for many uses in industry—particularly for solving numerous problems in fields where it is essential to stop corrosion.

A letter from the company reveals the following information:

"We have been testing Copper Prime for a period of over two years to satisfy ourselves regarding its value, and we are now placing it on the market with the view of having the larger industrials make their own tests. Due to the length of time necessary to make paint tests and due to the unreliability of accelerated testing, this will be a rather long process.

"Copper pigmented paints are

(Continued on page 111)

Shielded, Portable, Adjustable

The ideal fan for speeding up drying of parts or articles in process, accelerating ventilation in certain areas, and similar purposes. Motored fan can be tilted to direct draft upward, downward or straight outward on a level.

Operates from electric light socket and is furnished with vapor-proof or enclosed type motor, as desired. Propeller blade is nickel alloy aluminum. Height 46-in., weight 70 lbs., floor space 38-in. triangular. Price very reasonable.

Send for price, descriptive circular or for any additional information desired

AIR-MORE PRODUCTS CORP.
3402 Northwestern Ave. Indianapolis, Ind.

DIFFICULT LACQUER PROBLEMS

are being solved satisfactorily with

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EDITORIAL

The Finish a Sales Appeal

Today, appearance is one of the greatest single appeals to the purchaser, whether he is buying motor cars, lighting fixtures, furniture, clothing or what not. There was a time when motor cars were purchased from the utility motive alone but today, after a purchaser has compared motor power, wheel base, body lines, equipment and so forth he finally comes down to the question of appearance or finish, and it is here that many a sale is made or lost.

To a remarkable extent this same question of appearance exerts a great effect upon the salability of motor bus rides to the public. The well-finished motor stage coach pulls more cash fares out of a given territory than the poorly-equipped and finished motor coach operating on the same time schedule.

The real appearance appeal is obtained by a judicious combination of design, body lines, workmanship and finish. All other details may be of the highest standard, but if the finish is not correct, attractive appearance will be lost. On the other hand, even though the design or body lines may not be of the best, good workmanship and an excellent finish will often create the buying urge which otherwise would be lacking. A fine finish can often redeem a poor design, but nothing can hide a poor finish.

Matching Colors Perfectly

A new color analyzer, known as the recording spectrophotometer, which eliminates human judgment entirely in the analyzing and matching of colors, has been developed by Professor Arthur C. Hardy of the department of physics at Massachusetts Institute of Technology and of the staff of the research laboratory of the General Electric Co.

The new instrument not only measures color accurately, but it makes a record by which it is possible to match that particular shade or tint at any time, thus eliminating all possibility of a standard color fading.

It is necessary only to put a sample of the desired color before a window in the instrument, turn on the current, wait a moment, and then remove a paper on which a color-value curve has been registered. The operator then compares that curve with those of the samples already on file, or makes a curve of that color which seems to be like the one in question.

If the curves are alike, so are the colors.

In the past the difficulty has been that under certain light conditions colors might appear to be alike, but prove to be decidedly different when viewed under other conditions.

—Executive's Service Bulletin.

Copper Pigmented Paints

(Continued from page 109)

not new. They have been used successfully in several fields, especially for marine work.

"Copper Prime is made by a protected process. It contains 7 lbs. of actual copper per gallon. This copper is in the form of oxides which are compounded with hydrocarbon oils (no linseed). Copper prime will dry in approximately four hours and in about 24 hours the oxides are reduced from their original state to metallic copper in very finely divided form in the dry vehicle.

"Now it is quite evident that no matter how the product is made or what is in it, its real reason for existence is the result obtained upon application.

"Our tests have shown that it has great tenacity to the surface to which it is applied; that it stops and definitely inhibits corrosion; that it may be applied directly to the raw material over rust and over other paints such as lead or graphite; that it has real anti-fouling action for marine work and inhibits the action of boring insects; that it outlasts red lead and has a third greater covering power.

"Further, by special compounding, we have found it to be an excellent prime coat for use on metal under lacquers."

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Dealing with
FINISHES
Can Save Money by Using
Finishing Research Advisory Service

A helpful advisory service, which, for $100.00 a year*, gives you expert advice on every kind of finishing problem relating to processes, colors, paints, varnishes, lacquers, spray equipment, ovens, dipping, tumbling, and so on. **Plus traveling expenses outside of 100 miles from Chicago.*
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FOR CRACKED VARNISH

Brushed on over the old varnish scientifically "knits" and welds the old varnish together, closing all CRACKS and CHECKS permanently, at the same time brings back the life, color and beauty of old varnish on fine
Furniture, Cabinets, Pianos, etc.
A gallon will cover 400 sq. feet
PRICE $5.00
Trial quart sent postpaid $2.00 Full Instructions
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Makes Striping a Pleasure

It's a tool anyone can use—you, yourself, can turn out a PERFECT STRIPING JOB with just a little practice. The Jiffy Striper is used and endorsed by leading Artists and Painters of Flint, Mich.

Can be used with Duco or Lacquer—makes every sort of stripe from finest to a stripe ½-inch wide.

Costs only $10.00, Complete

Ask your supply dealer to furnish; if not, send your order and check today to:

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Clamp to *any* tank and mix *all* liquids. A wide variety of sizes and types up to 50,000 gallons capacity.

MIX QUICKER

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COST LESS

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The Features that insure the supremacy of "Hy-Speed" Mixers are fully covered by U. S. Patents

Write for Catalogue

ALSOP ENGINEERING CO.

47 West 63rd St., New York

Color Stimulates Bird Cage Sales

If you haven't visited a store selling bird cages of late, you are in for some pleasant surprises in the way that color is adding new life and selling points to this otherwise dull line of merchandise—used to house the family pet, the canary bird. The bird cages of yesterday that came in brass and those that looked as if some one had given them a smattering of paint in an effort to doll them up—these have given way to cages finished in a wealth of color most pleasing to the eye. The new decorative effects have proved a big factor in making the till of the store keeper ring more often that it has before.

Here in the new cages of today, we see striking yellows, that match the bright colored songsters, or show off to better advantage the dark colored varieties; others come in delicate pinks, apple greens and soft blues, while those of solid brass have seed guards of heavy glass handsomely embellished with decorative sprays of flowers painted in natural colors. Color is the thing in cages.

The standards, like the cages, come in colors to harmonize with the cages. These are finished in different colored bronze effects, with here and there a stretch of gold bronze that breaks up the otherwise straight color, thus creating a pleasing contrast.

From my observations at a recent sale of bird cages and birds in my home town of 25,000 persons, where several hundred cages and birds were sold in a two day sale, the merchandising value of color in moving this stock of cages was quite evident. Many people came with the object of buying a bird only, but once

inside the store the sight of these cages in colors was the magnet that made the folks forget their old cages at home. Color did its work; it resulted in the sale of large numbers of cages that otherwise would never have been sold but for the new color effects. I never saw bird cages go so fast before.

The store manager was surprised at the sales made and frankly acknowledged the value of color in creating sales. I left that store firmly convinced that the manufacturer who put color into the bird cages certainly knew his "onions," for the old fashioned bird cages of yesterday, looked like relics from the past compared with these handsome colored cages of the present day. And the success of the whole matter can be summed up in just one word: *Color.*—Arthur J. Owen.

CADILLAC SHELLAC

— a synonym for HIGH QUALITY in Shellac.

CADILLAC SHELLAC COMPANY
Incorporated
Ferndale (Detroit) Michigan

OIL-LAC COATER

Cuts the cost 50% to 200% whether using varnish or lacquer finish, for the following places

Inside Radio and Music Cabinets
A Cheap Finish on Novelties
Backing Up Table Tops
A Drawer Coater
Inside China Cabinets
Backing Up Case Goods

Dries in 10 Minutes *A Flat Wax Finish*
5 Gallon Sample at Drum Price

The Columbus Varnish Co. Columbus, Ohio

SAN-ITAI-RIE FILLER
Pat. No. 1658605
For All Defects in Wood

Manufacturers in all wood-using industries find SAN-ITAI-RIE FILLER unsurpassed in filling cracks, worm holes, knot holes, open joints, dents, pitch pockets, etc., and through its use are able to send out their products without a flaw.
Put up in friction top cans—half pints to gallons—in 20 different colors. Send for sample can.

SAN-ITAI-RIE FILLER CO.
Division of
164-170 W. Kinzie St. G. J. Liebich Co. Chicago, Ill.

CLASSIFIED ADVERTISING

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

SALESMEN WANTED

We will soon have several more openings for experienced industrial and furniture factory salesmen to sell varnishes, lacquers and enamels. You must have an acquaintance and business in territory traveled. Character, habits and record clear with good reason for changing. No easy jobs, wild expenses or fancy salaries. You show us. Our business is growing, we want business producers and money makers. Address IF-258, care Industrial Finishing.

EXPERIENCED FINISHER WANTED

Who is ambitious to become a salesman. A man who has not only the practical knowledge to intelligently advise with his prospective customers, but the necessary bearing in sales approach. We would like to have a man who is now working in a furniture factory in North Carolina or Virginia. Applicant must state age, education and initial salary desired. Address IF-250, care Industrial Finishing.

SALESMAN FOR INDIANA

Wanted; a high-class salesman and demonstrator who is well acquainted with the furniture factories in Middle West, especially Indiana and who can sell Varnishes, Lacquers and Enamels made by an old well-known manufacturer with established trade in this territory. This is a good position for a real salesman who is willing to work. Write giving experience, references, etc. Answers will be held in strict confidence. MAYER & LOWENSTEIN, Long Island City, N. Y.

FOREMAN FINISHER

And color designer desires position with any good furniture house or would act as demonstrator for color or varnish house. 25 years' experience. Best of references. Address IF-257, care Industrial Finishing.

SERVICE MAN

Foreman finisher of 25 years' experience in both production and quality work, capable of designing the right finish for any kind of furniture, practical on any finishing material. Now employed. Would like to connect as service man with some first-class supply house. Address IF-255, care Industrial Finishing.

EXPERIENCED INDUSTRIAL SALESMAN

Desires position in the east. Have sold lacquers, varnishes and enamels to furniture, toy and metal products manufacturers. Have had finishing experience also. Address IF-254, care Industrial Finishing.

DEMONSTRATOR WANTED

Old established varnish and enamel concern requires the services of a high-grade finisher to demonstrate the use of lacquers, enamels and varnishes on hardwood, etc. In applying, state all experience and furnish personal and business references. This position affords splendid opportunity for advancement. Address IF-256, care Industrial Finishing.

SALESMAN WANTED

With experience and following for the Midwest states. We manufacture a high-grade line of varnishes, enamels and lacquers. Replies will be treated in strictest confidence. JOHN G. CARLSEN & CO., 1446 W. Kinzie St., Chicago, Ills.

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